Illinois
Environmental
Protection Agency

Environmental Programs
2200 Churchill Road
Springfield, Illinois 62706

March 1986

IEPA/ENV/86-008 (final)

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THE SOUTHEAST CHICAGO STUDY:

An Assessment of Environmental Pollution and Public Health Impacts

Printed by authority of
the State of Illinois
15330 3/86 200

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Table of Contents

Appendix A: Metal Concentrations in Soil Samples

Appendix B: Laboratory Data Sheets - Organic Contaminants in Soil

Appendix C: Soil Boring Logs

Appendix D: Division of Water Pollution Control Ambient Network Data (1967-1977)

Appendix E: Description of Treatment Processes, NPDES Permit Information and Compliance Data for Wastewater Discharges Entering the Calumet River

Appendix F: DAPC Point Source Emissions Inventory

Appendix G: Standard Industrial Classification Codes

Appendix H: Lead Emissions in Study Area

Appendix I: USEPA Studies in the Southeast Chicago Area

Appendix J: Chicago Regional Port Authority Comprehensive Plan 1984

Appendix K: Additional Soil Sampling

List of Tables

List of Figures

1.0 Introduction

Southeast Chicago, in the vicinity of Lake Calumet, is a heavily industrialized region that has a long history of serving as a disposal area for a wide variety of industrial, commercial, and residential wastes. In the late fall of 1982, the Illinois Environmental Protection Agency (IEPA) was asked by a citizens group, Irondalers to Abolish the Chemical Threat (I-ACT), to conduct a study of environmental pollution in this area with special emphasis directed toward waste disposal practices.

Subsequent to the initiation of work on the waste disposal study, additional concerns were raised by citizens and interest groups in the area and also by the Agency. These concerns, which related to the extent of toxic pollutant contamination which may have resulted from years of heavy industrial activity in the area, led to a significant expansion of the overall scope of the study to encompass all the major environmental programs (air, land, and water). Additionally, the size of the study area was increased.

The final scope of work included a broad range of environmental concerns relating to air, water and land pollution issues. This scope of work was reviewed and approved by the I-ACT liaison committee. Additionally, as part of the overall effort, an analysis of available health statistics was performed by the Illinois Department of Public Health (IDPH) to determine if cancer rates or the number of birth defects occurring in the area are unusual. This report summarizes the results of these study efforts.

It should be noted that available time and resources severely limited the extent to which each of the complex environmental issues could be investigated. Of principal concern was the question of whether there was imminent danger to human health in the area from environmental pollutants. Based upon the available data, this report concludes that this is not the case. However, since many of the health impacts of concern are long term in nature, this report should be viewed as a starting, rather than an ending, point. The quality of the environment in Southeast Chicago needs improvement; some pollutant concentrations do exceed acceptable levels. Ongoing health and environmental programs that affect this area must emphasize expeditious attainment of all health-related standards.

1.1 Study Design and the IEPA's Commitment to the Citizens of the Lake Calumet Region

Most of the intensive studies concerning environmental problems in Illinois have been directed toward specific sites or facilities, and have usually addressed single medium (i.e., air, land, or water) concerns. This investigation presented unique challenges in that the study area is relatively large, there is a great variety of pollutant emission sources (including landfills, an incinerator, steel mills, and chemical plants), and there is a full complement of environmental issues which need to be considered.

Because of the desire to complete the study in a relatively short time and without supplemental funding, the IEPA, in cooperation with the IDPH and Region V-USEPA, designed a special "toxics hot spot assessment" program for the study area. As part of this special program, historical data available from routine IEPA activities was combined with new information on the status of land, water, and air pollution. Analyses of these combined data sources have provided a better basis for future decision-making by the IEPA, local government and the public.

A major purpose of this study was to develop a compendium of environmental data for the study area to serve as a useful baseline for subsequent assessments of overall environmental quality and public health. A second purpose was to provide the citizens of the study area with an educational document to be used in making informed decisions regarding the environment and land use. A third purpose of the document was to assess what actions should be done next (i.e., are additional studies needed and to what extent are they warranted).

In order to make the best use of IEPA resources, the study utilized existing data bases as much as possible. However, it was necessary to conduct some additional field work. This included using the IEPA's drill rig to extract soil and groundwater samples throughout the study area for laboratory analysis, conducting ambient air toxic pollutant monitoring, taking fish flesh samples from Lake Calumet and a limited USEPA groundwater and soil sampling program. In addition, the IDPH analyzed available health statistics to compare cancer in the study area to those in the rest of Chicago.

1.2 Description of the Study Area

The boundaries of the study area, depicted in Figure 1.1, are as follows:

North -- 95th Street
South -- Sibley Boulevard
East -- Illinois/Indiana Border (Avenue A)
West -- King Drive/C. and E.I. Railroad Tracks

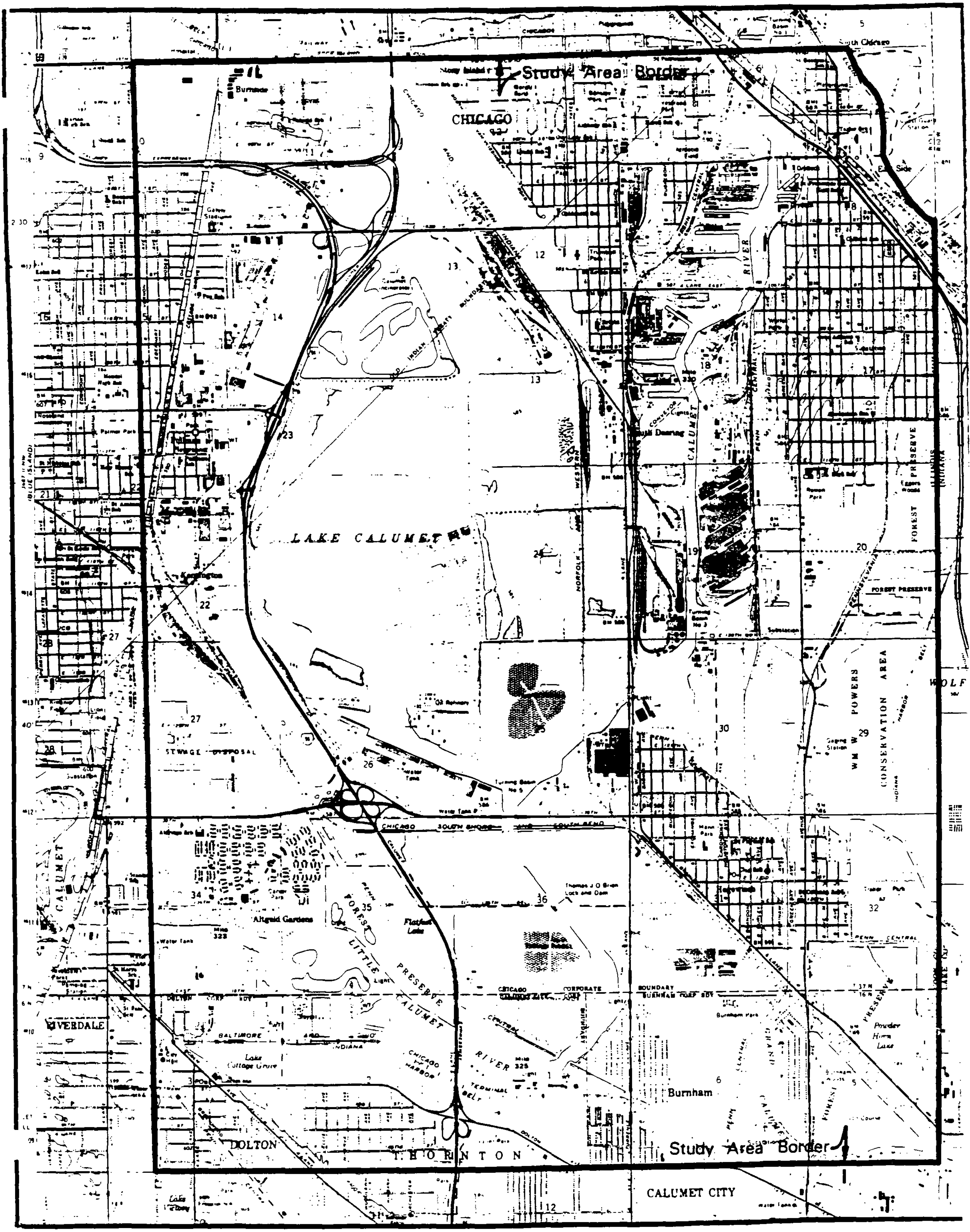


FIGURE 1.1

South Chicago Study Area Boundaries

2.0 Summary, Analysis, Conclusions and Recommendations

The following information is grouped by media and category consistent with the main body of the report.

2.1 Summary of Water Pollution Impacts

1. The quality of the fishery and associated biological communities varies within the study area. The quality of the Calumet River fishery upstream of the O'Brien locks appears to be very good and reflects the influence of the Lake Michigan fishery and dominance of the diversion water in the system. The fishery downstream of the O'Brien locks is of lower quality. Yellow perch dominate the lakeward half of the Calumet River while bluntnose minnows are the dominant fish species in the lower half. The fishery of Lake Calumet has game species including largemouth bass, black crappie and yellow perch. The northern portion of Lake Calumet generally has higher quality fish communities than the more industrial developed areas around the harbor complex. The lake apparently provides for a limited bass population in the river around the inlet. Localized conditions can provide for recreational fishing opportunities.

2. Lake Calumet fish flesh sampling was conducted in October of 1983. Contaminant analysis of largemouth bass, carp, and crappie was done. The analysis included testing for PCBs, hexachlorobenzene, hexachlorocyclohexanes, heptachlor epoxide, chlordanes, DDT and analogs, dieldrin, endrin, trans-Nonchlor, and percent fat. All contaminant concentrations measured were less than the Food and Drug Administration (FDA) action levels. FDA action levels are limits on the amount of contaminants present in fish flesh, and suggest limits on the consumption of fish with concentrations exceeding the levels.

3. The Metropolitan Sanitary District of Greater Chicago (MSDGC) currently maintains sampling stations on the Calumet River. A review of data collected for the period 1970 through 1981 concludes the following:

   a. The concentrations of cyanide in the Calumet River have decreased over the period 1970 through 1981.
   b. The concentrations of total suspended solids (TSS) in the Calumet River have decreased over the period 1970 through 1981.

4. The large industrial sources along the Calumet River no longer discharge their wastewater to the Calumet River. General industrial wastewater discharges from these sources are pretreated and discharged to MSDGC. In general, these sources release only cooling water or noncontaminated stormwater runoff.

5. The Agency maintained an ambient water quality network in the study area from 1967 through 1977. From 1978 to the present, a network is operated by MSDGC. The data collected at the Agency's stations indicate that the water quality for the Calumet River from Lake Calumet to Lake Michigan is generally good with few toxic substances in violation of secondary contact standards. The overall water quality of the Calumet River from Lake Calumet to Lake Michigan has been and continues to be generally good.

2.2 Summary of Air Pollution Impacts

1. Facilities which emit over 100 tons per year of any single pollutant are generally termed major point sources. There are twenty-two major facilities which have been identified in the study area. These facilities include steel mills, chemical plants, auto assembly plants, and a hazardous waste incinerator.

2. There is a wide diversity of so-called area-type sources in the study area. These include odor emissions from landfills and sludge drying beds and particulate emissions from general activity at major industrial complexes.

3. Ambient air monitoring has been conducted in and around the study area since 1960 by both state and local air pollution control agencies. The available air quality data base is composed primarily of total suspended particulate (TSP) data and data resulting from the chemical analysis of TSP samples. The monitoring network operated in the study area in 1984 consisted of four TSP monitors, two ozone continuous monitors, one sulfur dioxide continuous monitor, and one nitrogen oxides continuous monitor. The TSP monitors are located at Addams, Anthony, Carver, and Washington Schools. PM_{10} concentrations were measured at the Washington High School site in 1984. An additional PM_{10} and TSP monitor has been installed at Bright School and is collecting data in 1985. Although TSP concentrations have been decreasing significantly since 1976, as late as 1980 levels at all four TSP monitoring sites in the study area exceeded the annual health-related National Ambient Air Quality Standard (75 ug/m^3). However, in 1984 only one site (Washington High School) exceeded the annual, health-related standard. A decrease is also apparent in the peak 24-hour averages.

4. Ambient lead concentrations are also decreasing in the study area. Violations of the lead National Ambient Air Quality Standard (a quarterly average of 1.5 ug/m^3) were measured in 1974 and 1975, but there have been no violations since then. The areawide average of the peak quarterly lead values has decreased to less than a third of the national standard in the last two years.

5. Other than for lead, no ambient air quality standards exist for the TSP-related trace elements. However, when trace element averages in the study area are compared to Illinois statewide averages, the trace constituents listed are consistently higher in the study area than in the State as a whole. The trace elements measured are sulfates, nitrates, copper, iron, and manganese.

6. Nitrogen dioxide (NO_2) has been monitored at Addams Elementary School since 1974. During that time, the annual average had an upward trend from 1974-1979, followed by a downward trend from 1979-1984. The annual National Ambient Air Quality Standard (100 ug/m^3) was not exceeded during any of the years. The trend in NO_2 levels in the study area parallels that of other areas of Chicago and Cook County during these time periods. However, the magnitude of NO_2 concentrations in the study area has generally been lower than in other parts of Chicago and Cook County.

7. Ozone has been monitored at two sites since 1978 (Roseland and Southeast Police Stations). There is no real trend since 1978 in either the peak concentrations or the number of days exceeding the standard. Some years have been below the one-hour National Ambient Air Quality Standard (0.12 ppm) and other years have been above.

8. During warm summer days, odors emanating from industrial areas, landfills, sludge drying beds, and landfill runoff areas can be trapped just after sunset when winds die down and near-ground-level inversions start to form. The decreased dispersion associated with this meteorological phenomenon often results in short-term odor problems.

9. The IEPA, in cooperation with the Illinois Department of Energy and Natural Resources, funded a study of toxic air pollutants in the Lake Calumet area of Chicago. The study was conducted by TRC Environmental Consultants, Inc. The results of the study were as follows:

   a. Of the 31 toxic pollutants monitored using a mobile trace gas monitoring system (TAGA 6000), only three were detected -- toluene, benzene, and xylene. Additionally, acetone was detected; however, it was not on the list of 31 toxic pollutants to be monitored. There are no air quality standards for these contaminants. However, the levels detected for these pollutants were all below the multimedia environmental goals (MEGs) suggested by the USEPA. MEGs describe levels of contaminants in ambient air that are predicted by USEPA not to produce negative effects in the surrounding population or ecosystems.

The levels of toluene, xylene and benzene measured in the study area were compared to levels found by the USEPA in other cities and another location in Chicago. A statistical comparison of the pollutant levels found in these ten cities and southeast Chicago shows that the values measured in southeast Chicago were not significantly greater (p less than 0.05) than the levels found in the other cities.

b. Seven toxic substances were sampled, using selected fiberglass high-volume filters for analysis. The filters were from the four TSP monitors located in the study area. Sampling was conducted for dioxin, arsenic, beryllium, nickel, polychlorinated biphenyls (PCBs), cadmium and chromium. Dioxin and PCBs were not detected on any sample. Low values of the other five pollutants were found at various sampling locations. The results of the filter analyses for arsenic, beryllium, cadmium, chromium and nickel were compared to both (TLV/300 and TLV/420). TLVs (threshold limit values) are occupational exposure standards established by the American Conference of Governmental Industrial Hygenists. They are designed to protect the worker from adverse health effects based on an 8-hour workday and 40-hour workweek exposure. The TLV/300 figure has been used by some local, state and federal agencies as a guideline for safe ambient levels in lieu of National Ambient Air Quality Standards. TLV/420 may be viewed as equivalent to a MEG. All levels measured were below both TLV/300 and TLV/420.

2.3 Summary of Land Pollution Impacts

1. There are 31 (operating or retired) landfills and waste handling facilities in the study area (Figure 4.1). Most of the sites which are not retired are generally in compliance with permit conditions. However, there are some exceptions to this finding. These are discussed further in Chapter 4.

2. The IEPA took soil borings and conducted groundwater sampling in October of 1983. Samples were taken at twenty-two locations throughout the study area. Analyses were conducted for metals and organics in soil and groundwater. The results were as follows:

   a. There were no significant amounts of organic compounds in any of the soil samples tested.

b. Metals in soil samples were tested by acid digestion and compared to normal ranges and means. Total metal content as determined by acid digestion is not directly comparable to leached metals. How much a metal leaches out of the soil determines the health risk associated with that metal. However, it may be reasonably concluded that, if soil metals fall within a normal range, then there is not a leachable metal problem. This is borne out by the analysis of metals in groundwater. Some additional leach testing may be necessary for total metal soil samples which do not fall in a normal range. Levels of metals in some soil samples in the study area above the normal range and means were found for chromium, cadmium, manganese, selenium and zinc.

3. Iron, manganese and silver in groundwater were slightly above the General Use Water Quality Standards. The concentrations found, however, indicated little potential health hazard.

4. Low concentrations of several organic compounds were detected in groundwater samples taken at Grids No. 12 and 14 (by the entrance basin to Lake Calumet and near Republic Steel) and appear to be the result of the industrial activity in this area.

5. The Division of Land Pollution Control resampled soils at five locations. These sites were indicated as potentially hazardous due to their surface concentrations of certain heavy metals (selenium, chromium and cadmium). In general, metal acid digest results (total metal content in soil) indicated concentrations of one or more of these specific metals to be slightly above or in the upper end of their common range of concentrations in the soil. Although some of the metal acid digest test results were above the common range for the metal in soil, EP Toxicity test results, which determine the toxicity of the soil, were well below the accepted maximum concentrations for the metals. This indicates that the metals were "tied into the soil" and were not leaching into the groundwater.

2.4 Summary of Public Health Study

In response to a request from the IEPA, the IDPH conducted a detailed review of cancer mortality in the Southeast Chicago study area. The review involved four separate studies. The University of Illinois School of Public Health and the Illinois Cancer Council participated in one of the subsequent studies.

First, a reanalysis of the draft cancer mortality report was performed which used methods similar to the preliminary (draft) study. Second, a time trend analysis of cancer mortality rates assisted in the interpretation of cancer rates within the six community areas of Southeast Chicago. Third, a detailed analysis of cancer mortality by specific cancer types was done for each age, race and sex group of the community areas within the study area. Lastly, a separate study of cancer mortality was performed for one census tract of South Deering on the northwest side of Lake Calumet; the analysis was requested by Mr. Edward Vrdolyak and Mr. Ed Hernandez.

Unlike the first preliminary study, which was reported in the draft Southeast Chicago study, the additional analyses have corrected for the major influences of age, race and sex on the influence of cancer in Southeast Chicago. Failure to correct these influences will result in incorrect estimates of cancer rates. The additional studies have also taken a closer look at specific types of cancer. The draft preliminary analysis used a manual process to perform over 1,000 calculations; the additional analyses used over 24,000 calculations using computer programs.

The combined findings of these four different analyses support the existence of excess cancer mortality in the study area of Southeast Chicago.

Lung cancer deaths were significantly greater for white males in the study area than would be expected for men of similar age in Chicago. A consistently higher lung cancer mortality rate for the study area, when compared against all of Chicago, was noted. This excess may be related to occupational exposures in the distant past or to a higher proportion of cigarette smoking history in this male population.

Bladder cancer deaths were found to be in excess for white females. This excess may be related to previous occupational exposures or some other factors as yet unknown.

An excess of prostate cancers was found in elderly white males in Hegewisch. There are no known environmental associations with this form of cancer, although some occupational associations have been reported in the medical literature.

These findings generally support an excess of lung cancer deaths in white males and bladder deaths in white females. From other published research studies, these two types of cancer have been associated with environmental exposures to carcinogenic substances, primarily smoking tobacco and chemicals in the workplace. If another common environmental exposure (such as air or water) was associated with these excess cancers, we would have expected to find an excess in both males and females in both whites and non-whites. The fact that the excess in lung cancer mortality occurred only in white males suggests that some factor unique to this subgroup, such as smoking tobacco or previous occupational exposures, might account for the excess. Similar risks might also explain the excess bladder cancer found in white females. However, since no excess lung cancer risk was found for white females, it is unlikely that this group smoked more cigarettes on the average than other white females in Chicago. Some other factor, such as occupational exposures, may be more likely to account for the excess bladder risk in white females.

Based upon the additional analyses, it cannot be concluded that excess cancers could be attributed to environmental exposures in the air or water.

2.5 Analysis, Recommendations and General Conclusions

The Southeast Chicago study area is a densely populated, highly industrialized area. This area represents a very unique concentration of industrial sources and landfills in the state of Illinois. As detailed in Chapters 4, 5 and 6, many of these sources have been (and continue to be) the subject of intense compliance monitoring and enforcement. The following table is a breakdown of the number of investigations, Compliance Inquiry Letters/Warning Letters, compliance conferences and enforcement cases initiated with/against facilities in the Southeast Chicago study area:

	Inspections	CIL's/Warning Letters	Compliance Conferences	Enforcement Cases
DLPC (1970-1984)	938	111	20	10
DAPC (1981-1984)	295	424	91	10
DWPC (1974-1984)	97	27	9	6
Totals	1330	562	120	26

The DLPC data is based on Agency activities with respect to the 31 waste facilities identified in Figure 4.1. The DAPC data is based on Agency activities with respect to the 22 major facilities (Figure 6.1) and 93 minor facilities in the study area. The DWPC data is based on Agency activities in regard to the twelve facilities identified in Figure 5.5.

Even though the individual sources in the study area are generally in compliance with current standards, the density of the source distribution itself poses environmental problems. Problems with air pollution and localized groundwater pollution exist in the study area.

In addition, citizens have reported odor problems. These problems are undoubtedly exacerbated by the density and types of different odor sources and their close proximity to residential areas. Possible odor sources contributing to the problem are landfills, steel mills, sludge drying beds, chemical plants, painting operations at manufacturing plants, and stormwater runoff collection basins. All these sources exist in close proximity to one another.

Several special studies were conducted in the preparation of this report, in addition to the in-depth review of routinely collected data. The studies did not indicate large scale pervasive environmental problems. The health statistics collected by the IDPH indicate that cancer rates generally associated with toxic pollutants are not higher than the City of Chicago in general. While toxic air and land pollutants as measured by these supplemental studies do exist in the study area, their concentrations and areawide disposition do not indicate large scale acute environmental problems.

However, we cannot be quite so certain about the more subtle, long-term adverse impacts which may well be taking place, but which lie beyond our current ability to fully document. The ability to be more conclusive about the effects of lengthy exposures to very low levels of chemical substances requires a new set of regulatory tools. Sophisticated laboratory techniques can detect minute amounts of chemical substances -- down to parts per billions and parts per trillion -- but it is much more difficult to assess how exposure to such low levels affects human health over the course of decades.

During the various phases of data gathering for this study, a considerable number of chemical compounds were encountered (either through actual monitored levels or through permitted pollutant releases). Listed by division programs they include:

Land Pollution	Water Pollution	Air Pollution
Arsenic	Ammonia	Sulfur Dioxide
Barium	Lead	Carbon Monoxide
Cadmium	Zinc	Nitrogen Oxides
Chromium	Cyanide	Ozone
Copper	Hexchromium	Lead
Iron	PCB	Sulfates
Lead	Hexachlorocyclohexane	Nitrates
Manganese	Heptachlor	Copper
Mercury	Chlordanes	Iron
Nickel	DDT and analogs	Manganese
Selenium	Dieldrin	Toluene
Silver	Endrin	Benzene
Zinc	trans-Nonchlor	Xylenes
Benzene		Acetone
Toluene		Arsenic
Xylenes		Beryllium
Ethylbenzene		Cadmium
Pyridine		Chromium
Methylpyridine		Nickel
Dibutylphthalate		Mineral Spirits
		Hexane
		Isopentane
		Isopropyl Alcohol
		Naphtha
		Methyl Ethyl Ketone
		Methanol
		Methylene Chloride
		Phenol

The results of the Southeast Chicago study reinforce the need for a renewed effort among federal and state environmental and public health agencies to promote new approaches to environmental regulation so that the public can be assured that the manufacture, use and disposal of chemicals is safe.

The techniques chosen for this study were not designed to fully assess impacts that were long-term in nature. In order to maximize the utility of the monies spent on this project, a hot-spot detection approach was used. These techniques best lend themselves to detection of acute environmental problems. Chronic or long-term environmental problems could not be fully assessed under the constraints of this study. For this reason, this study and report should be viewed as a starting point rather than an ending point. With this in mind, the IEPA recommends that the following programs be instigated or has instigated these programs subsequent to the release of the draft document as a follow-up to the Southeast Chicago study:

1. Further assessment of odor problems in the study area appears warranted and necessitates a local, state and public cooperative effort. The IEPA has prepared an odor assessment program which is currently operating.

2. The USEPA has followed-up on the IEPA's pilot toxics air pollutant monitoring with a study of their own. The USEPA has operated a monitoring site at the 111th Street Police Station since April of 1985. The site samples the 31 organics monitored for in the IEPA's pilot study. Data is not yet available from this program. This monitoring effort is serving as a national prototype study for air toxic pollutants.

3. The IEPA has undertaken monitoring of certain air toxic pollutant (PCBs and nitrosamines) in the study area.

4. Sampling of private wells in the area has been made available to area residents to test for pollutant levels.

5. Biological toxicity monitoring in the area should be performed by the IEPA as the necessary laboratory facilities and techniques become available. Testing merely for the presence of chemicals is not enough. Whether or not they have a toxic impact on test organisms should be determined.

6. Further health evaluations covering a wider range of environmental concerns (particularly chronic) should be conducted with possible follow-up by the Center for Disease Control.

7. The State is developing a cancer registry which would provide information on the incidence of specific cancers in the population. Current statistics only provide data on some cancer deaths. A more complete reporting system is needed to identify areas of concern due to unusual rates of cancer incidence.

8. The State should expand the base of available information regarding the location and handling of toxic chemical substances in community settings. This data is essential for comparison with health statistics to pinpoint potential "hot-spots". During the 1985 legislative session, the Illinois Chemical Safety Act was passed. This law will provide for better advance planning with respect to any sudden releases of toxic chemicals.

9. Future studies of exposure to levels of various chemicals of interest should be undertaken. These studies should be conducted as models of overall multimedia exposure become available. The Graphical Exposure Modeling System (GEMS) and the PIPQUIC multimedia environmental data base are being used by the IEPA to perform this evaluation. GEMS has been developed by the USEPA to provide a method for assessing and visually displaying multimedia environmental exposure levels in an area. It considers population, natural environmental data, and levels of the chemicals of interest. PIPQUIC allows "what if" type of analyses to be performed. The IEPA and the USEPA are cooperating in use of these models as well as in developing an air toxic pollutant emission inventory for the study area.

10. The IEPA will address the special surveillance activities necessary to adequately control the unique mix of industrial sites/landfills in the study area. Recommendations based upon this determination should be incorporated into the IEPA's future work plans.

11. This document should be used by interested parties in planning the land-use of the Southeast Chicago study area.

3.0 History of the Study Area (Land Use and Patterns of Industrial Growth)

3.1 Timeline Outlining Growth and Development of Southeast Chicago

The history of southeast Chicago parallels the development and growth of the greater metropolitan area. Following is a timeline which tracks that progress chronologically:

1830 -- U.S. government purchased much of Calumet region from Potawatomie Indians.

1833 -- Chicago incorporated.

1837 -- First settlers in Dolton and Riverdale area.

1840 -- First sewers laid in Chicago; first settlers in South Deering (Irondale, Jeffrey Manor, Memorial Park).

1847 -- First settlers in Roseland (West Pullman).

1848 -- Illinois and Michigan Canal completed.

1851 -- East Side becoming settled.

1854 -- Peak of cholera epidemic.

1856 -- Construction begun on first modern sewer system in Chicago.

1862 -- Feeder canal built from Little Calumet River to Illinois and Michigan Canal.

1869 -- Brown's mill opened (became Wisconsin Steel).

1871 -- Chicago began to use lake water from the Two Mile Crib; Chicago fire; first cargo vessels entered Calumet Harbor.

1873 -- Land subdivided for housing; plat maps drawn.

1880 -- Pullman Palace Car Works and town of Pullman began.

1883 -- Grand Crossing Track Company opened (became part of Republic Steel).

1889 -- Calumet region annexed to Chicago; Chicago Sanitary District created.

1891 -- Drinking water from Chicago first delivered to southeast area; typhoid epidemic reached its peak.

1892 -- Dolton and Riverdale incorporated.

1893 -- Columbian Exposition held in Jackson Park.

1898 -- South Chicago Steam Boiler Works begun (became U.S. Steel South Works).

1900 -- Sanitary and Ship Canal completed; began dredging and straightening of Calumet River.

1902 -- International Harvester formed; Inland Steel began operation in Indiana Harbor; Gary, U.S. Steel founded; first electric and gas energy in South Deering.

1905 -- Harvester purchased mill and renamed it Wisconsin Steel.

1907 -- Began installation of sewers in South Deering.

1916 -- Youngstown Sheet and Tube mill in Indiana Harbor constructed; Navy Pier completed.

1920 -- Began installation of sewers on East Side.

1922 -- Cal-Sag Channel completed; Calumet sewage treatment plant began operation.

1930 -- Republic Steel incorporated.

1933 -- World's Fair held in Chicago.

1938 -- Paved 103rd Street to become major industrial road.

1940 -- Dike built at 110th Street across Lake Calumet to develop garbage dump to north.

1957 -- Groundbreaking for city incinerator.

1958 -- Chicago Skyway completed.

3.2 Description of Neighborhood and Industrial Development

3.2.1 Background

When the glaciers receded, water covered most of the leveled land that is now part of the metropolitan area of Chicago. The waters, known as Lake Chicago, flowed southwest along the Illinois River valley. As the St. Lawrence Seaway was carved out, the level of Lake Chicago dropped and water on the land receded, exposing lake plains, flat and low. Large marshes with poor drainage were also formed. The water began to flow northeast, into Lake Michigan. Surface material was dense stony clay, without layers or stratification. Stony Island Ridge (originally a reef) deflected currents toward the south, depositing sand and gravel, leaving a shallow lake. It is believed that this lake, Lake Calumet, originally extended from 103rd to 129th Streets, with an average depth of about three feet.

The earliest work activities were hunting, fishing, and farming. Later there was some sand mining and lumbering. A few fertilizer and rendering plants were also established. Through the 1850's, however, only a few railroad lines and homes were scattered through the region.

Prior to the founding of the iron and steel industry plants, no significant industrial, residential or even agricultural development had taken place. The land was marshy and sandy. Consequently, when the steel interests recognized the value of the lakeshore and the banks of the Calumet River to large scale industry; they were able to acquire all the land they needed in large blocks because no subdivision for residential purposes had taken place.

One of the chief requirements of the iron and steel industry was facilities to receive ore by boat. There were no natural harbors on the lakefront and the mouth of the Calumet River was accessible only to small boats. The low shore, the shallow water fronting it, and the character of materials underlying both the land and the lake (unconsolidated sand and clay till) made the dredging of artificial harbors and canals relatively easy and inexpensive.

3.2.2 Industrial Development

Although southeast Chicago was developed because of natural resources, the area has always been controlled by outside influences. James H. Bowan, a friend of President Lincoln, was an entrepreneur that promoted and developed the Calumet region. In 1869, Bowan used his personal yacht to bring bankers and influential businessmen from Chicago down the Calumet River to the opening of the Joseph H. Brown Iron and Steel Company. Brown's mill later became Wisconsin Steel. The mill was located on the west bank of the Calumet River at 109th Street. This location was excellent for the industry -- far enough away from the city to have inexpensive land, low land providing places to dump slag and improve drainage, abundant water, and developing transportation resources.

In 1869, wealthy bankers from Chicago formed the Calumet and Chicago Canal Company to develop the land. They persuaded Congress to appropriate funds to dredge and improve the Calumet Harbor and River.

In 1871, the first cargo vessels entered Calumet Harbor, generating an immediate real estate boom. Also, the Chicago fire of that year caused many to relocate to the Calumet region. There was a small commercial area present at 92nd Street and Commercial Avenue. In the late 1800's, numerous steelmaking ventures were initiated in the southeast Chicago area. The steel and iron industry eventually grew to dominate life in these neighborhoods. By the early 1900's, after several mergers, sales and resales, several major steelmaking facilities had emerged: Inland Steel (1902); Wisconsin Steel (1905); U.S. Steel - South Works (1909); and Republic Steel (1930).

The first two decades of this century brought growth in traffic on the Calumet River until annually it was five times that of the Chicago River. The facilities on the river supported the expanding industrial activity of the southeast side. The U.S. Steel-Gary Works in the town of Gary, Indiana was completed in 1902. Standard Oil operated twelve cracking stills in 1913. The catalytic cracking process included plat-forming, polymerization, and alkylation. These processes produced 100+ octane gasoline for the war effort. Until the plat-forming process developed, the results of coal processing were xylene, toluene, and benzene.

Electronics and radio manufacturing developed in the Chicago area during this time. Many innovations were made in steel production to meet the demand for steel in automobiles, stoves, fencing, and assembly lines, among other products.

Inland Steel completely electrified operations. They pioneered in the use of oxygen in open hearth furnaces. Between 1926 and 1930, three companies were consolidated to become Republic Steel, the third largest steel mill company in the United States.

During World War II, $1.2 billion was spent for construction of war plant facilities in the Chicago metropolitan area, more than in any area of the country. This increased manufacturing capacity 50 percent. After World War II, those government-owned plants were sold to private companies, producing further industrial expansion.

3.3 Examples of Three Neighborhood Developments

3.3.1 South Deering

The neighborhood known today as South Deering was developed in three separate sections: Irondale, Jeffrey Manor and Memorial Park (Slag Valley). The first settlement in Irondale was on the west bank of the Calumet River at about 106th Street. Lake Calumet was about twice its present size and extended north to Trumbull Park (105th Street). Much of the area was low and marshy and flooded frequently.

By 1880, Irondale had grown to a population of 926, settling between 103rd and 110th Streets. The center of the business district was Torrence Avenue along 106th Street. At the turn of the century, Irondale was formally named South Deering.

In 1902, South Deering first obtained electric and gas energy because of combined efforts of International Harvester and the South Deering Improvement Association. By 1914, South Deering was residentially mature with single family, one story frame homes. Torrence Avenue was paved, while most other streets were sand. Some sewers had been installed, but an extensive sewer system was not operational until 1922.

In 1925-26, a study of housing and neighborhood conditions was made of the area between 108th and 109th Streets and Torrence Avenue to Calhoun Avenue. Smoke and dirt were prevalent; land in open spaces was low and marshy with rubbish heaps. The area on both sides of Torrence Avenue was rural with flocks of geese and sheep grazing. Small frame houses were predominant. The area north of 103rd Street has apparently been used for slag and waste dumping for decades. Homes were built on top of that slag in the 1940's. The area was first called Calumet Gardens, then Jeffrey Manor.

3.3.2 Roseland and Pullman

At its peak, the community of Pullman incorporated parts of what is known as Altgeld Gardens and Roseland. Each neighborhood developed separately until George Pullman purchased the land to develop his model town.

Immigrants from Holland arrived in Roseland in 1849. They settled on the most high and dry ground, at Michigan Avenue between 103rd and 111th Streets. Their first businesses were truck farming and selling cheeses and butter.

During the 1870's, Roseland was a growing community. The center of business and travel was at 111th Street and Michigan Avenue. Farms and grazing land surrounded it. Further subdividing and development occurred in Roseland west of Lake Calumet in the 1870's, providing shelter for the workers and their families for the new steel industry.

George W. Pullman began his Palace Car Company in 1880. He purchased much of Roseland, developing a model town for his employees up to the western shore of Lake Calumet. His goal for this community was complete self-sufficiency. He included every type of industry necessary to service the company and the town. He implemented his theory that labor/management problems could be averted if employees enjoyed a superior home environment with recreational opportunities in the community. He also theorized that this environment would attract skilled workers, resulting in greater productivity.

The community of Pullman was built west of Lake Calumet in a grid of 300 acres of the total industrial land area of 4,000 acres. The homes of the workers were row houses set in a highly planned area. The style and location of a home assigned a worker related directly to his rank in the workplace. Children attended Pullman Technical School (now Mendel High School).

Public ways were paved. Trash collection was included in the rental fees. The farm grew fresh produce, cash grain crop, and supported a dairy herd. Bricks for the homes were made at a Pullman brickyard. A 700-ton Corliss engine from the 1876 Centennial Exposition in Philadelphia was used to provide energy to both industry and homes.

Storm sewers were separated from sanitary sewers. Water from roofs and streets was carried down gutters to catch basins, then piped to Lake Calumet. Sewage was carried in glazed pipes to a 300,000 gallon reservoir located beneath a 75 foot water tower, then pumped to a sewage farm three miles away. Subsurface drainage was returned as effluent to lakes and rivers in the area. Public water supply was from Lake Michigan, stored in the 500,000 gallon water tower. Pullman also provided for recreational opportunities at Lake Calumet, landscaping, and open space in the community. Streets were tree lined. Parks and a reflecting pond near the train station were developed with carefully planned flowers and shrubs.

It was a grand experiment that had many advantages. However, it did not produce the results Pullman had sought. In 1894, the Pullman strike occurred, one of the landmark events in labor history. As a result, George Pullman was forced to dissolve his corporate interests in the town.

3.3.3 East Side

Until 1873, the area now called East Side was described as "open, flat, wet, desolate, reedy, and inhabited only by birds and waterfowl, especially migratory birds".

The growth of this area can be attributed to its strategic location between the east side of the Calumet River and Lake Michigan. The Pullman development encouraged growth in South Chicago, South Deering and the East Side.

By the turn of the century, the steel mills had stimulated as much growth in East Side as they had in South Deering. What was to become the Fair Elms subdivision in East Side was prairie and marshes with ridges. There were still only a few houses south of 106th Street.

Just after World War I, Frank J. Lewis purchased land at 112th Street from the Pennsylvania railroad tracks to the state line. His intention was to begin his sixth coal tar plant. However, Chicago put a moratorium on industrial development in that area because of a lack of housing. Lewis' property was rezoned residential. During the 1920's, Lewis installed low level sewers, leveled the land with slag fill, and laid out streets, lining them with elm trees. He sold his coal tar company but kept the land. He built apartment houses along 113th Street between Avenues G and L, but halted construction just before the depression. After that period, he developed the area in single family units. The community became known as Fair Elms.

3.4 Environmental and Health Concerns

3.4.1 Water Problems: Drinking Water Supplies and Sewage Disposal Needs

As early as the 1830's, local governments were concerned about the health and economic problems associated with industrial and human wastes disposed of in the waters of the metropolitan area. Chicago was incorporated in 1833, and one of the first acts by the Town Board was to pass an ordinance against disposal of dead animals in the Chicago River. In 1834, the Board of Trustees authorized construction of a public well. The first sewers -- largely wooden -- were installed in Chicago in 1840. But by 1854, one of every eighteen residents died of cholera. In 1856, construction began on Chicago's first modern sewer system which was a grid of self-flushing sewers with brick mains discharging into the Chicago River. The streets of the city were raised -- up to twelve feet -- to provide adequate drainage. Yet, in spite of these improvements, the water supply in the river and lake was again seriously threatened by pollution in 1858.

The public water supply intake was extended outward into the lake several times until 1869, when the city began to receive water through a new distribution system, new pumping works, and water tower. The new intake was two miles offshore, pumping through a tunnel under the floor of Lake Michigan.

With all of this innovation, the river was still highly polluted. The depth of the I and M Canal was obviously too shallow to reverse the flow of the Chicago River. To supplement the water volume and create more southwest flow, a supplementary canal was built in 1862. This canal fed water from the Little Calumet River in Blue Island to the I and M Canal to provide for barge navigation. The success was minimal; the Chicago River once again became stagnant and increasingly polluted and unsafe.

Other projects were undertaken to pump, dredge and dam the river, with only temporary results. Then the Chicago Sanitary District was created in 1889. By 1900, the new District had constructed the Sanitary and Ship Canal, finally reversing the flow of the Chicago River. This left the water supply in Lake Michigan protected, wastes were carried downstream, and a navigable waterway linked the Great Lakes to the Mississippi River.

3.4.2 Health Effects

The environment and health were closely related in several ways, and various actions were taken to recognize these conditions and improve them.

The typhoid epidemic reached its peak in 1891. As lake water from Chicago began to service the southeast area, health improved.

Through most of the developing years of the steel industry, employees remained unprotected while at the plant. It was common for them to suffer from silicosis, deafness, nervous disorders, and skin diseases. The average worker missed 1 and 1/2 weeks of work annually due to illness. But the companies and unions began to develop programs for safety, protection and compensation, which greatly improved the health of the employees.

A survey conducted in 1890 disclosed that there were 3,558 dwellings in South Deering averaging 7.26 people each. The 33rd ward covered 13,000 acres but residents lived in only one quarter of that land area. It was not long before the area had an average population density per acre but had severe overcrowding. The refuse from the Calumet River into Lake Michigan was described as being equivalent to a population of 700,000. Chicago tried to eliminate other health hazards farther north by not allowing sewer construction south of 95th Street because the sewage would drain into the Calumet River. The wind would carry the waste to the 68th Street pumping station which supplied drinking water to the south side of Chicago (39th Street or Pershing Road).

Until 1906, the only sewage system was to dig sand and gravel from the sides of roads, elevating it above water, and creating drainage trenches. Water from the trenches drained into cisterns, which were used by the Fire Department. In 1907, some sewers were installed.

Full sewage treatment began in 1922 with the operation of the Calumet plant of the Metropolitan Sanitary District of Greater Chicago. Improvements to that plant were made in 1935, 1960, 1965 and 1981. Chlorine treatment began in 1968.

Construction of the Calumet-Sag Channel began in 1911. Over sixteen miles long, its purpose was to drain sewage and runoff originating south of 87th Street. The flow of the Calumet River system was also reversed to protect the Lake Michigan water supply. The Channel was opened in 1922 and it became a federal waterway in 1930. Congress authorized appropriations for dredging the Channel in 1946. Major development of the Cal-Sag Channel and Lake Calumet began in 1955. Included in this project was dredging of the Channel and widening it from 60 feet to 225 feet.

Over the last 100-150 years, the annual death rate from all causes has dropped significantly in Chicago (Figure 3.1). Average life expectancy has increased in both Chicago and the State of Illinois (Figures 3.2, 3.3 and 3.4). These changes reflect improvements in health care and sanitation and a reduced incidence of air, water and soil-borne communicable diseases.

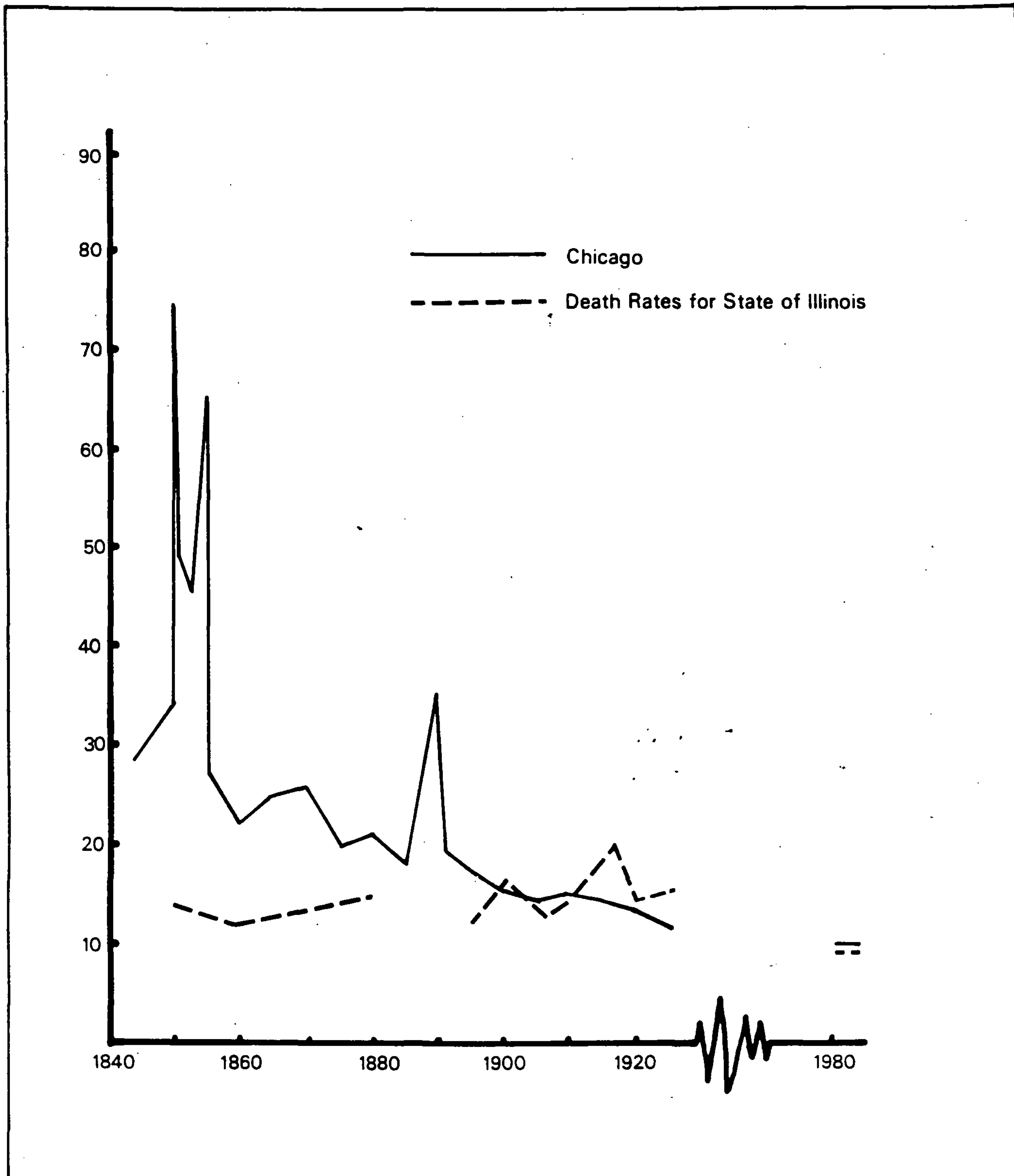


FIGURE 3.1

Annual Death Rates (per 1,000 population)
from All Causes

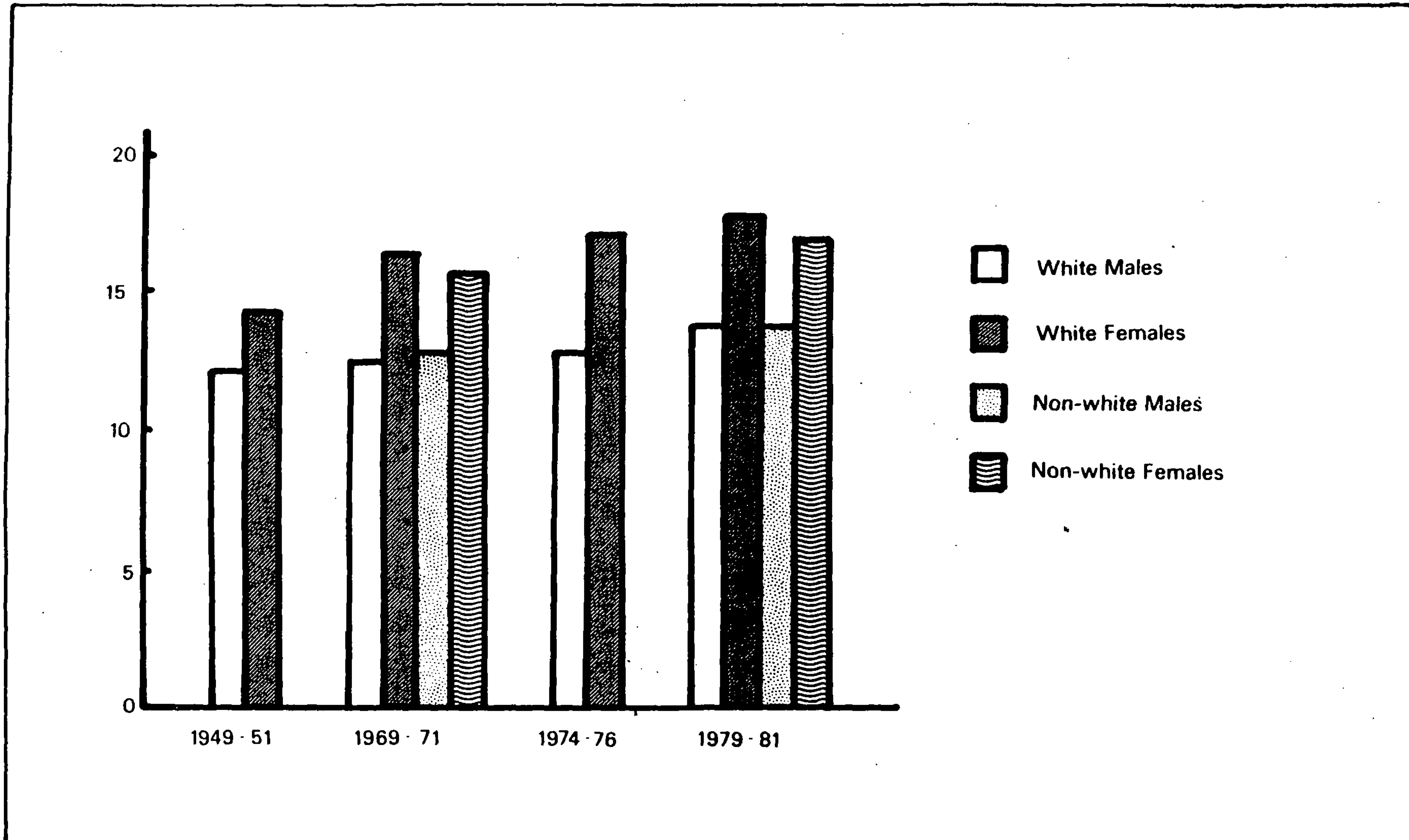


FIGURE 3.2

Average Lifetime Remaining at age 65 — Chicago, Illinois

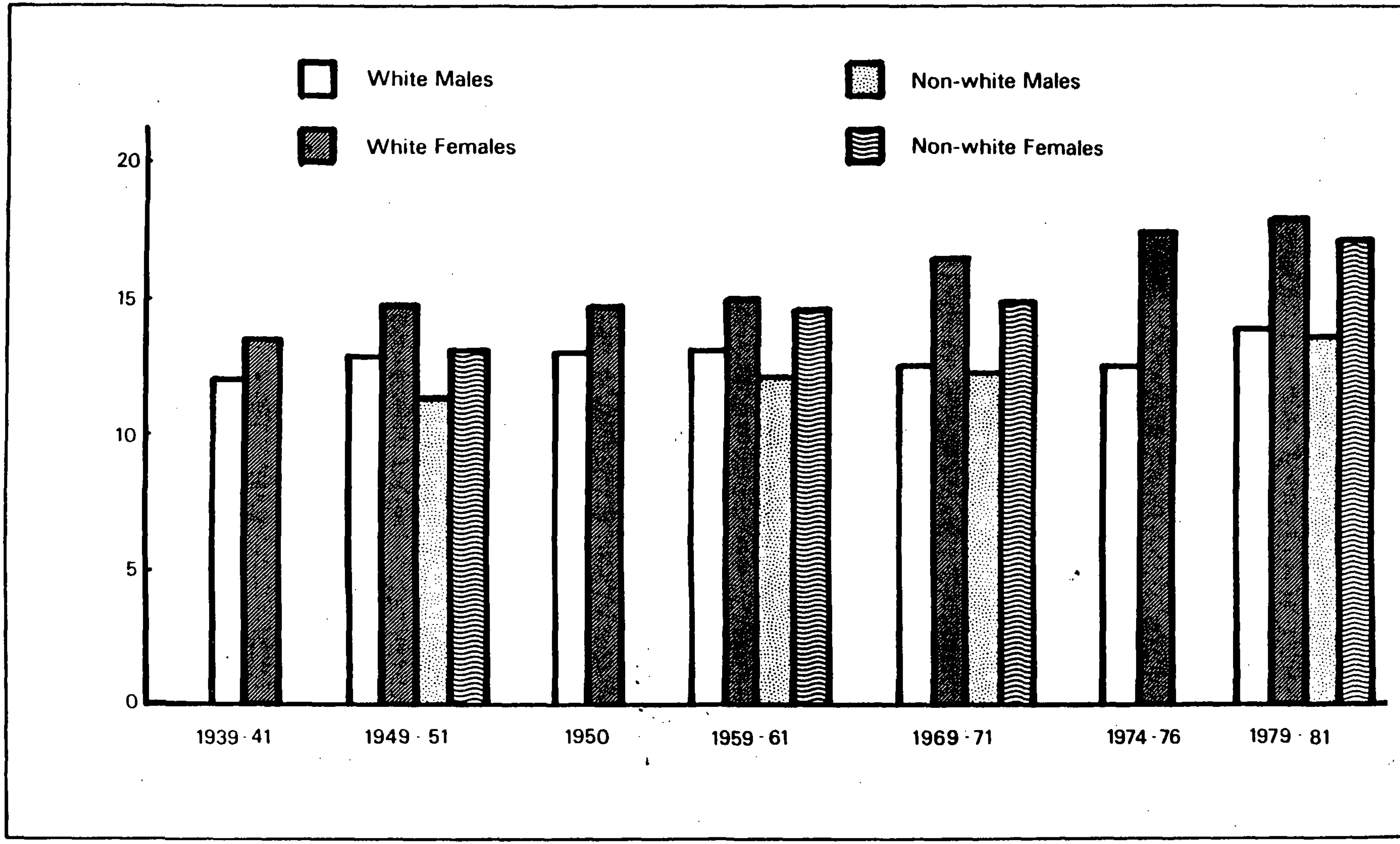


FIGURE 3.3

Average Lifetime Remaining at age 65 — State of Illinois

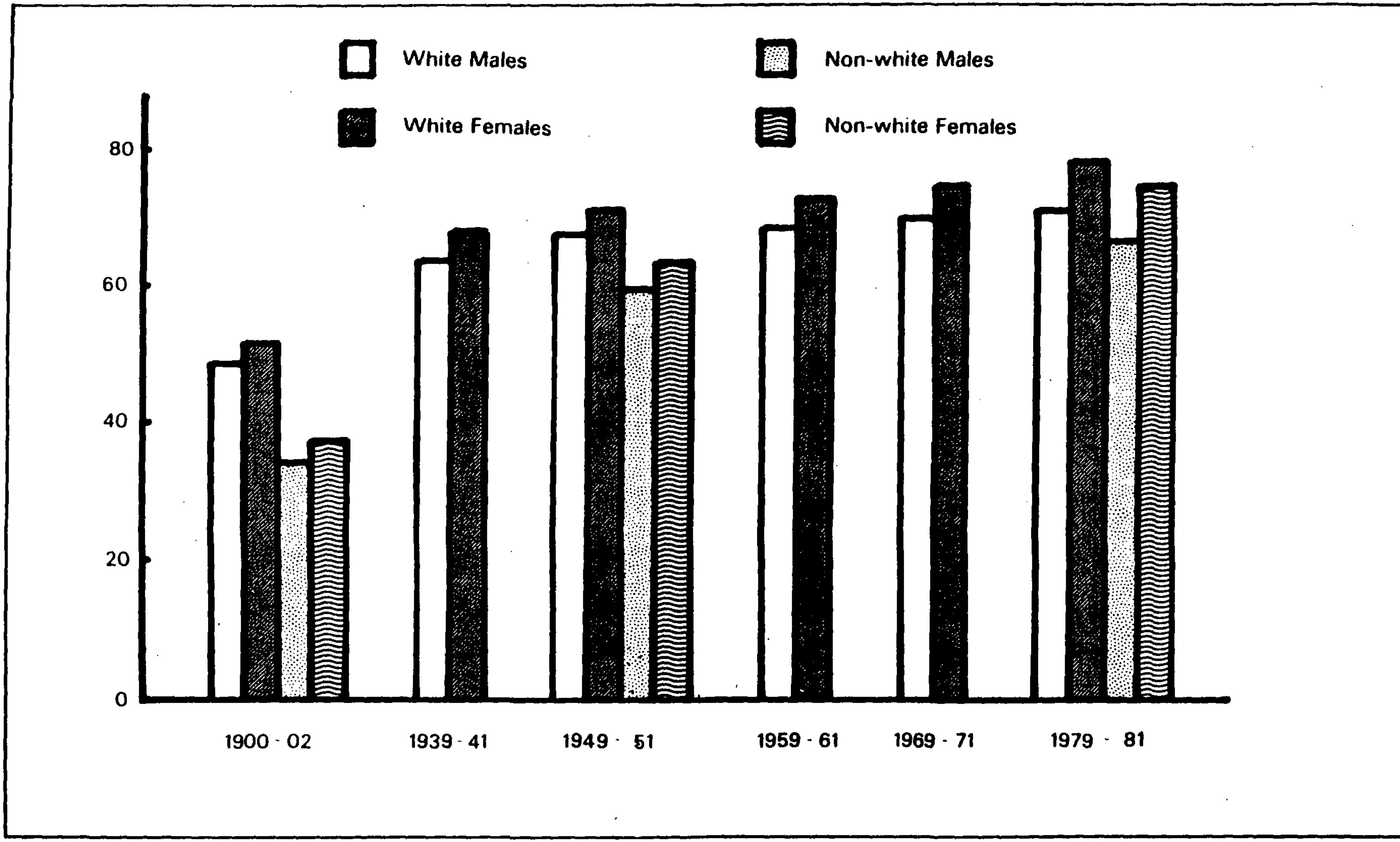


FIGURE 3.4

Average Lifespan — State of Illinois

The incidence of contagious disease can be closely correlated with changes in air and water quality. For example, the original public water supply for Chicago was installed in 1840. Water was pumped to the city mains from Lake Michigan without treatment. Until the direction of flow of the Chicago River changed in 1900, the lake not only supplied drinking water but also received all of Chicago's sewage. There were no currents in Lake Michigan to move soil and sewage away from the water intakes, and typhoid fever flourished (Figure 3.5). The advent of chlorination in 1912 further reduced the incidence of such water-borne diseases to near zero.

Malaria was also a serious problem in Chicago. The area was flat, the water table high, and mosquitos abounded. The inauguration of drainage in 1854 greatly reduced the malaria death rate (Figure 3.6).

Spread of airborne infectious disease was not significantly reduced until the germ theory of disease gained acceptance in the 1890's. From approximately this decade on, Chicago made serious efforts to improve air quality and reduce the spread of acute respiratory diseases, such as tuberculosis (Figure 3.7). By 1907, a comprehensive smoke abatement ordinance was passed and, in 1910, the City instituted the first ventilation standards for public places, factories, and workshops.

As contagious diseases were controlled, the death rates for cancer and heart disease increased (Figures 3.8 and 3.9). This may be due, in part, to increased life spans and improved diagnostic techniques. When infectious diseases were routinely fatal, many individuals died before any chronic disease was apparent. In addition, methods of reporting causes of death have varied widely. A death from lung cancer could have been recorded as "consumption" in 1850 or an "obstructive lung disease" in 1910. In Chicago, death rates from both cancer and heart disease seem to have peaked between 1950 and 1970 (Figures 3.8 and 3.9). The cancer death rate for the whole State of Illinois appears to be following the same pattern. Improvements in environmental quality and healthier lifestyles, as well as recent medical advances, should continue to reduce these figures.

3.4.3 Recent History

3.4.3.1 Air Pollution

Air pollution grew with the development of the steel industry. During the 1950's and 1960's, air pollution reached its peak. Keeping a home clean was a constant chore. Household items such as slipcovers, drapes, blinds, shades and windows needed washing much more frequently than in other areas.

Atmospheric conditions in these neighborhoods varied from good to very poor, depending on the way the wind was blowing. Only a rare northeast wind meant cool, clean air.

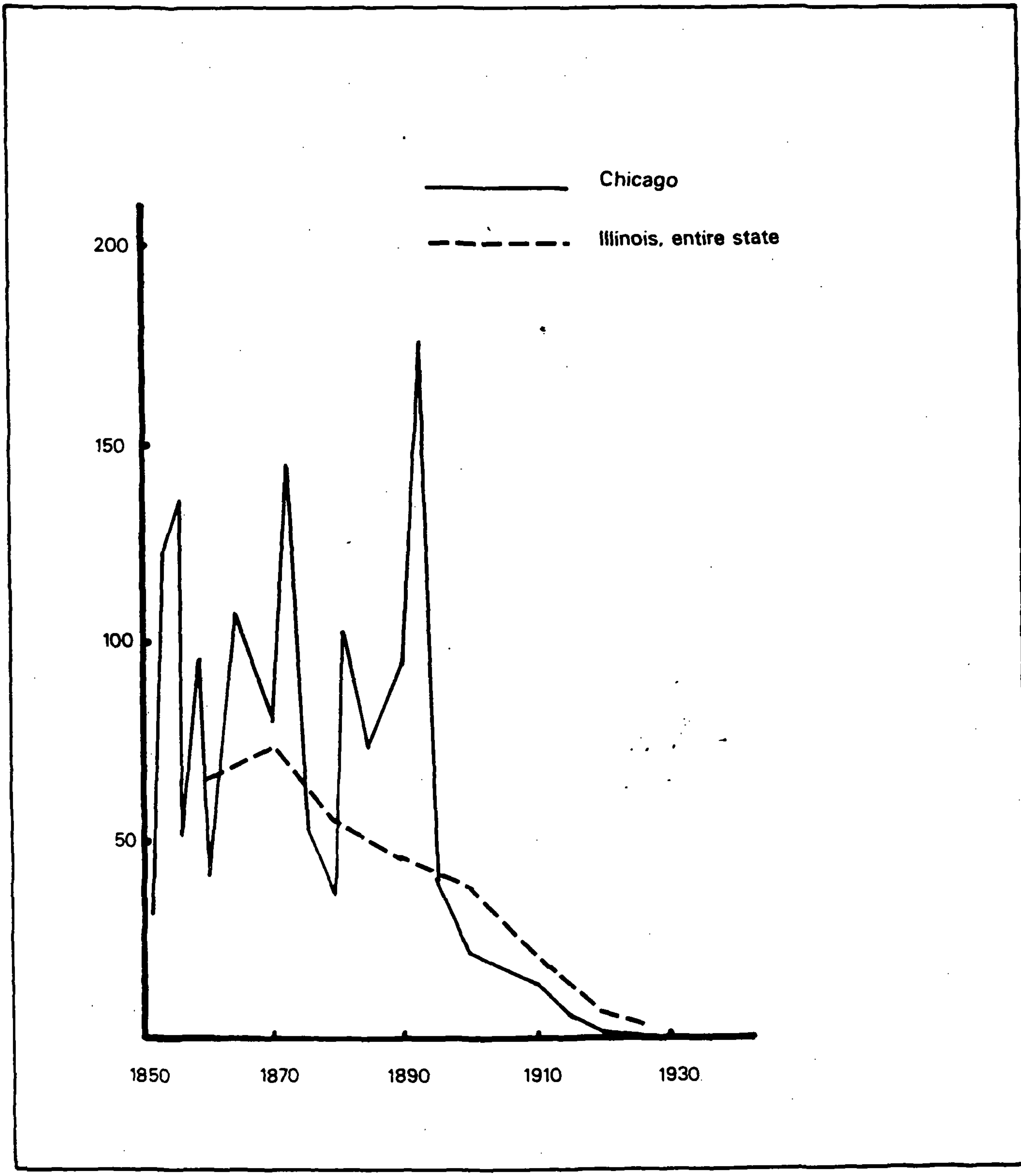


FIGURE 3.5

Annual Death Rate (per 100,000 population)
from Typhoid Fever

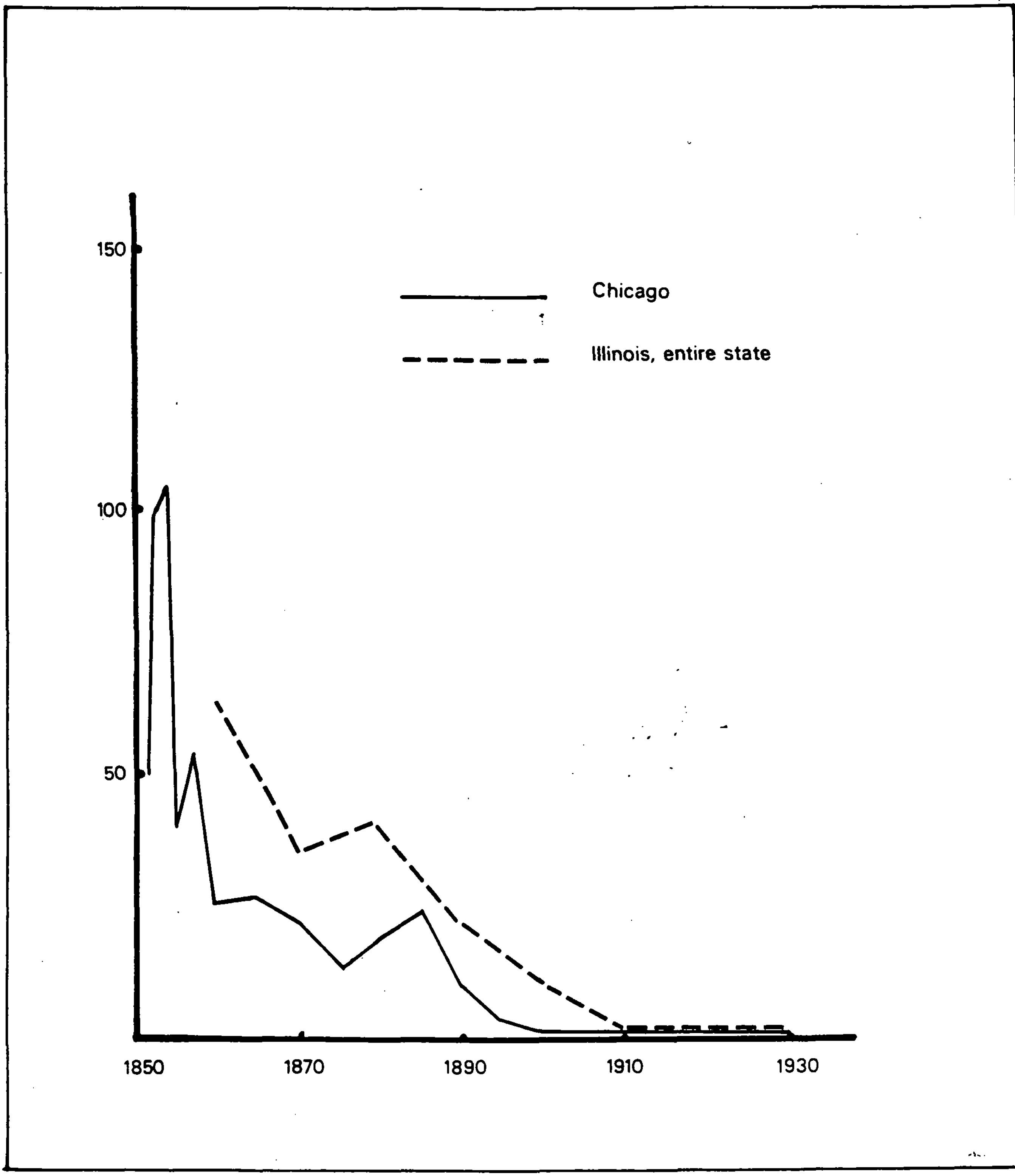


FIGURE 3.6

Annual Death Rate (per 100,000 population)
from Malaria

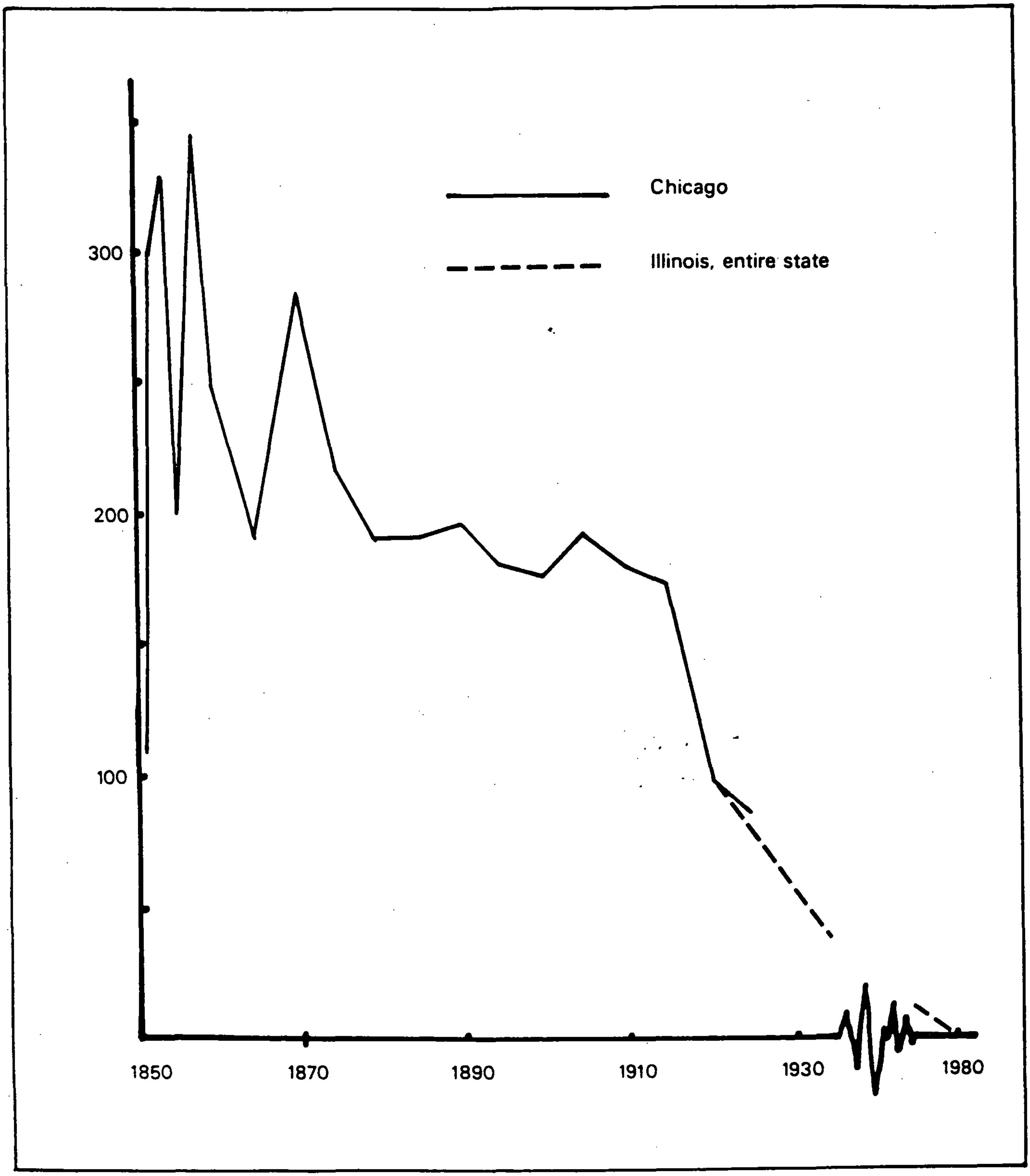


FIGURE 3.7

Annual Death Rate (per 100,000 population)
from Tuberculosis

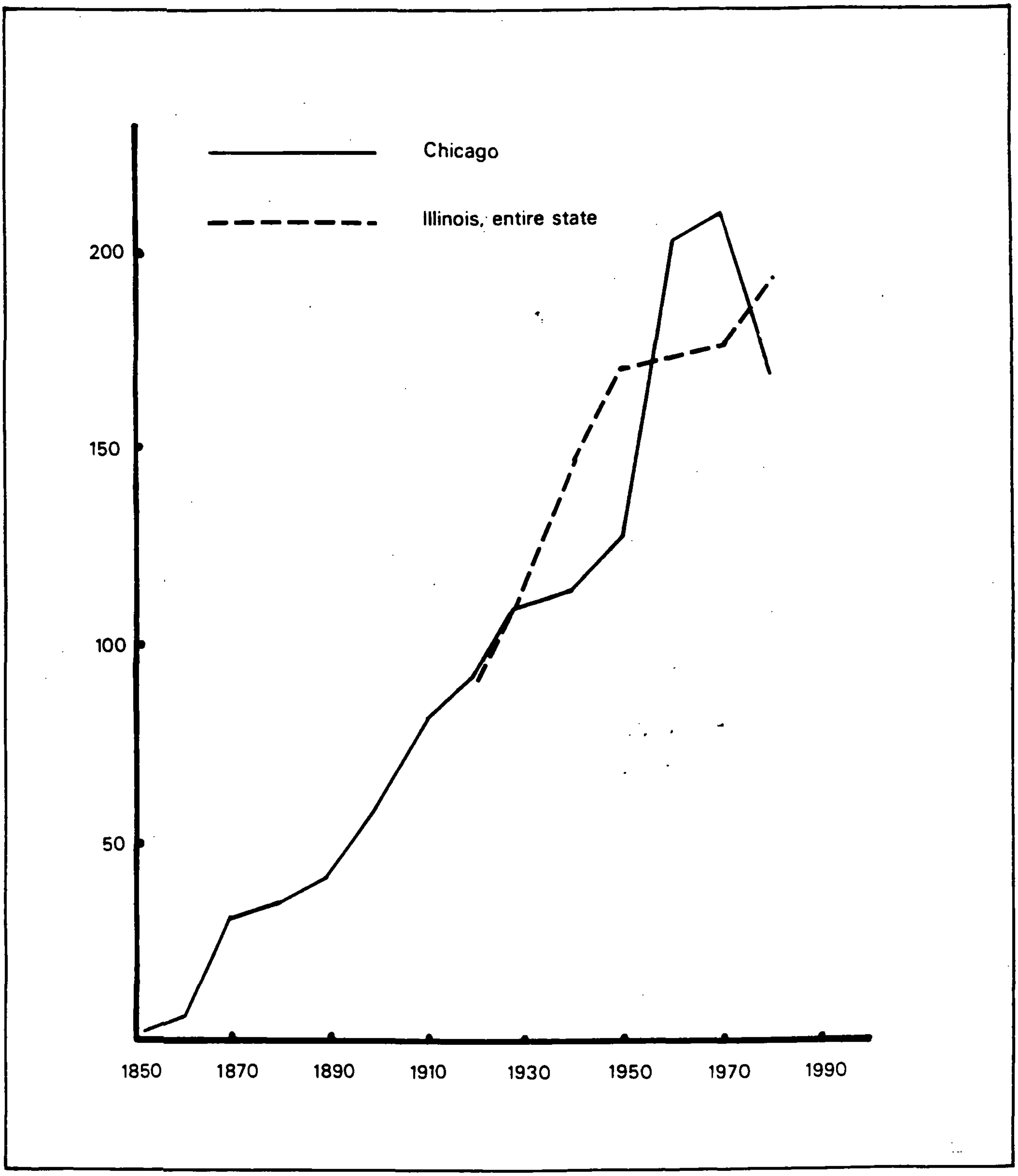


FIGURE 3.8

Annual Death Rate (per 100,000 population)
from Cancer

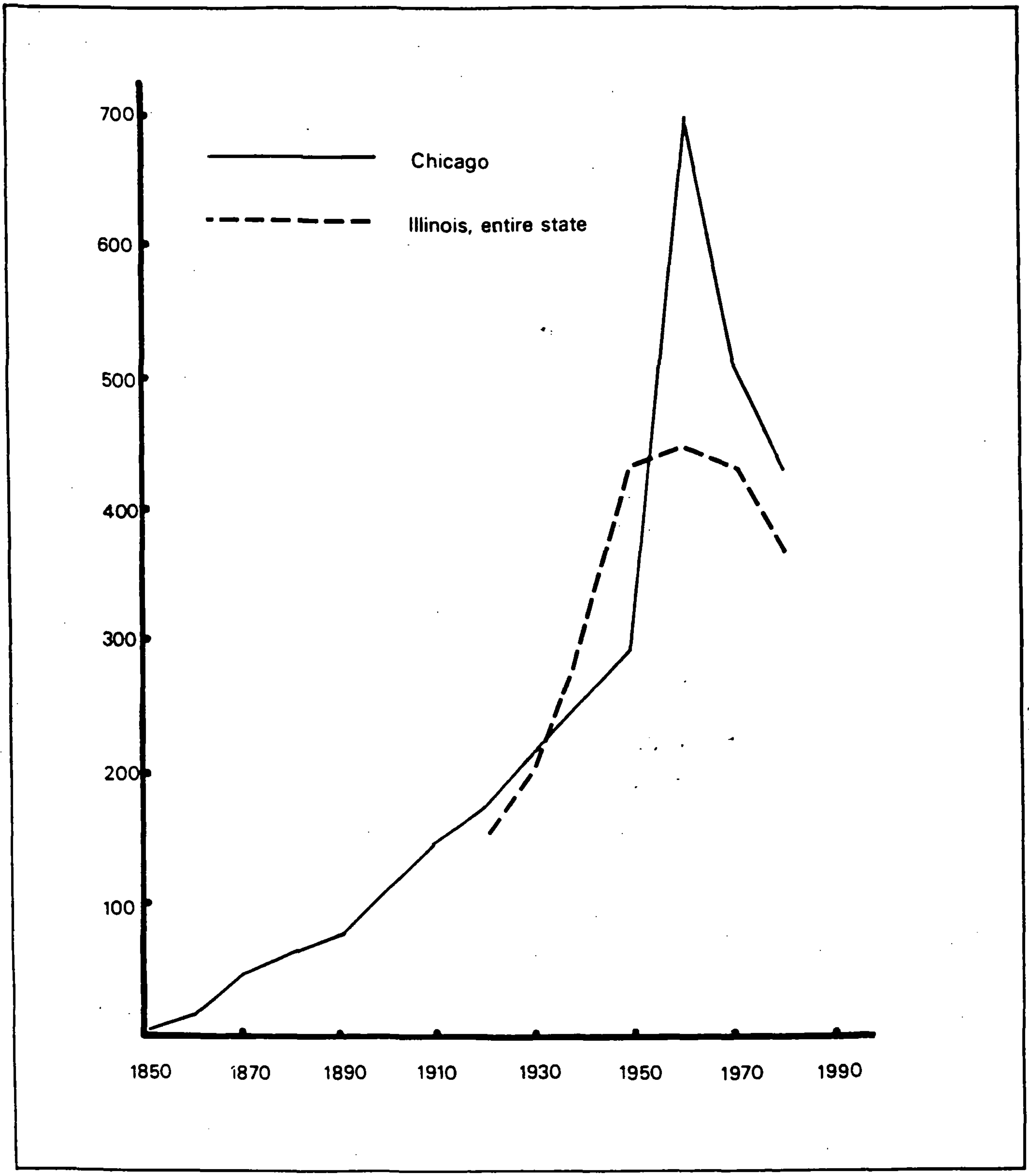


FIGURE 3.9

Annual Death Rate (per 100,000 population)
from Heart Disease

The City of Chicago built a dike at 110th Street across Lake Calumet in order to use the open space to the north as a 300 acre garbage dump. By 1953, residents in the area solicited aid from Alderman Pacini to discontinue use of the dump because the odors and fires were a nuisance. At first, the Alderman was unsuccessful.

In July of 1953, the city gave Pacini a commitment to eliminate the dump by January of 1954. This would be accomplished by either finding another site outside the city limits or building an incinerator. In August of 1954, citizens groups inspected the dump to observe the promised remedial measures. They found cover only on old garbage and no treatment of runoff into lakes, swamps and streams. But, by March of 1957, the groundbreaking was held for the incinerator at 103rd and Doty. The incinerator operated for several years until Waste Management purchased it and began operation of a transfer station. The garbage dump is presently used for sludge drying and disposal. After reaching capacity in 1990 or 1995, it will be used as open space.

The fallout from the steel mills regularly covered clothes and snow with dust and soot. In November of 1960, Mrs. E. Sorenson of the East Side organized residents to march on Mayor Daley's office concerning the particulates. In 1963, four of the steel mills developed air pollution reduction programs to be implemented over eight years. In return for their promise to clean house, the City of Chicago gave the steel companies a "variance" -- an exemption against prosecution for eight years. Air and water pollution became national issues in the late 1960's.

4.0 Land Pollution Assessment

4.1 Landfills in the Study Area

There are 31 (operating or retired) landfills and waste handling facilities in the study area. Figure 4.1 shows the approximate geographic distribution of these landfill facilities. The following descriptions are keyed to Figure 4.1 by number. The descriptions include a brief narrative on the type of landfill (solid waste/hazardous waste) and a description of the types of waste accepted. Also included, for the permitted sites, is a description of general operating practices and compliance performance.

1. 03160050 (ID No.) - Chicago/103rd Street transfer station
   103rd Street and Doty Avenue
   Permit No. 1980-29-DE - Issued 9/4/80

   Method of Disposal or Treatment: This is a waste treatment facility (transfer station) operated by Waste Management, Inc., and owned by the City of Chicago. The waste accepted and transferred to IEPA permitted facilities is restricted to general municipal waste and excludes special and hazardous wastes.

   Description of Past/Present Violations: The transfer station was cited April 6, 1983 for operating without a permit. An operating permit was subsequently issued on May 9, 1983.

   Qualitative Assessment of Operation: Generally in compliance with rules and regulations.

2. 031600 (ID No.) - Chicago/Chicago Department of Streets and Sanitation
   105th Street and Doty Avenue
   The Metropolitan Sanitary District of Greater Chicago (MSD) is operating this site as a sludge drying and disposal site. The central portion of the site is a closed and covered general refuse sanitary landfill, known as Chicago/Chicago Municipal Landfill. It is not permitted by DLPC because of sludge spreading for vegetative growth. This does not come under the purview of the DLPC permit program; however, it is permitted by the DWPC.

3. 03160016 (ID No.) - Chicago/Chicago Regional Port District No. 2 (Terra)
   111th Street and Doty Avenue
   Operating landfill for demolition material only.
   Not permitted by DLPC - earth and concrete to fill in low areas.
   This does not come under the purview of the DLPC permit program.

4. 03165101 (ID No.) - Chicago/Interlake Landfill and Coke Plant
   113th Street and Torrence Avenue
   Permit Nos. 1982-26-DE and 1982-26-OP - Issued 12/3/82

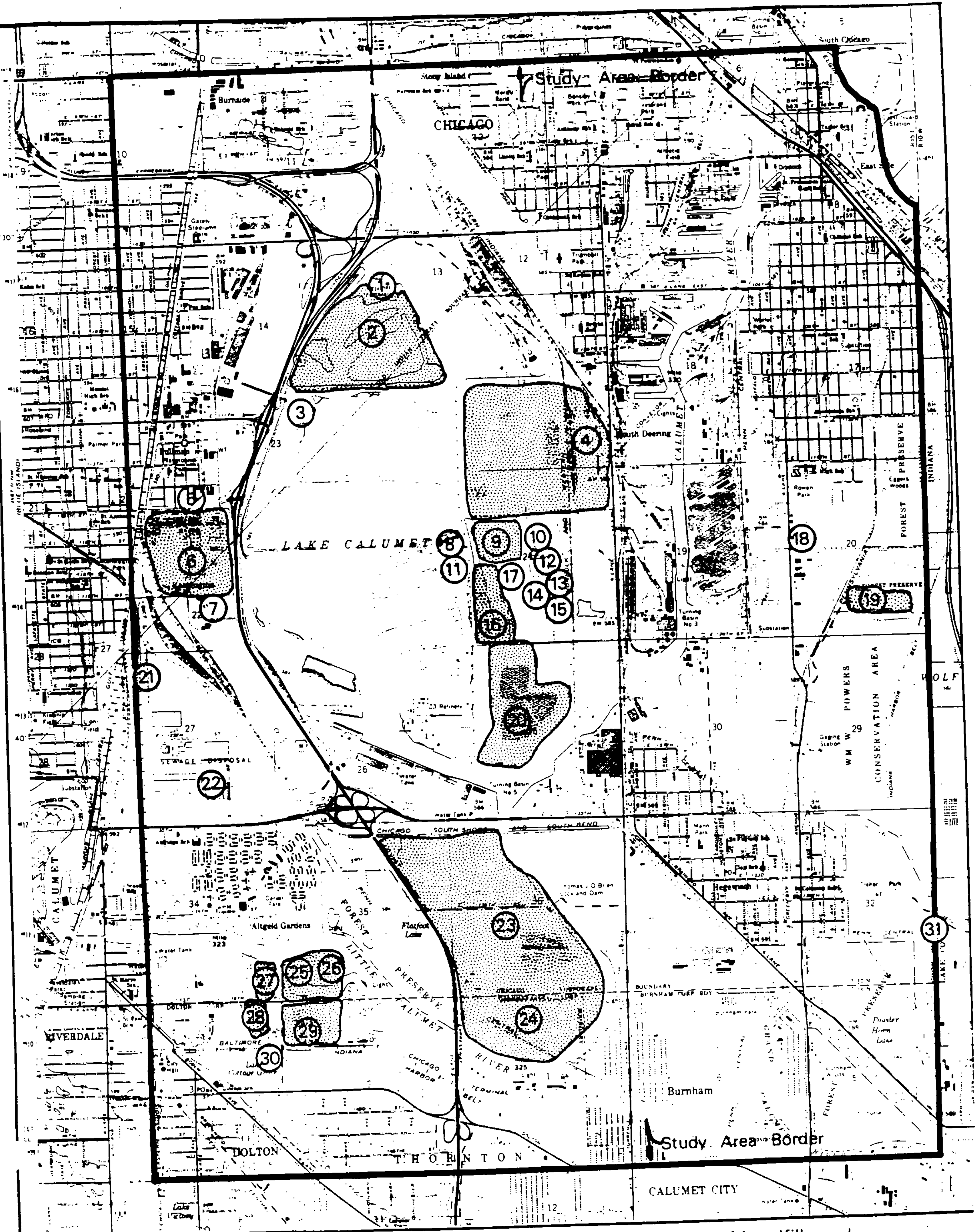


FIGURE 4.1

Geographic Distribution of Landfills and Waste Handling Facilities in the South Chicago Study Area. (see Section 4 1)

Method of Disposal or Treatment: This is a waste treatment facility (storage of "decanter tank tar sludge"). This tar sludge is a hazardous waste. This waste is generated at the rate of four cubic yards per day and is stored on site in waste piles until it is neutralized in the coal processing operation.

Description of Past/Present Violations: This storage site is now in general compliance with its State permit. However, the facility was cited for RCRA-ISS violations pursuant to 40 CFR 265.73 for failure to keep an operating record at the facility (i.e., a recordkeeping violation).

Qualitative Assessment of Operation: Generally in compliance with rules and regulations.

5. 03160041 (ID No.) - Chicago/Liquid Dynamics
655 East 114th Street
Permit No. 1980-8-DE - Issued 4/15/80
Permit No. 1980-8-OP - Issued 10/31/80

Method of Disposal or Treatment: This is a closed hazardous waste treatment facility that operated a wastewater treatment plant to handle industrial wastewater from paint, coatings, adhesives, food, health, beauty care, chemical processing, metal treatment and other industries, through the use of PH adjustment and an electro-chemical separator.

Description of Past/Present Violations: The facility ceased operation on or about October 12, 1982 as a result of involuntary bankruptcy proceedings filed by its creditors. The Illinois Attorney General filed a complaint against Liquid Dynamics et. al., on March 18, 1983 for failure to close the facility in accordance with 35 Ill. Adm. Code 725.111, failure to remove all hazardous waste from the site, and failure to obtain Financial Assurance documents as required by 35 Ill. Adm. Code 725.213.

The facility was subsequently the subject of an immediate removal action by USEPA under Superfund. This action (BBL Removal) was completed by the end of May, 1983. Two "Equalizer" tanks were left on-site (approximately half full of waste); litigation is continuing at the State Attorney General's Office.

Qualitative Assessment of Operation: This site has been closed for over a year. Prior to closing, manifest and housekeeping problems were the rule rather than the exception.

6. 03165003 (ID No.) - Chicago/Sherwin Williams
11541 S. Champlain Avenue
Operating (on-site) hazardous waste treatment and incineration. Not permitted by DLPC. This site is operating under a USEPA interim (Part A) RCRA permit. The site still has paperwork violation of its RCRA Part A permit.

7. 03165001 (ID No.) - Chicago/Inland Metal
119th Street and Calumet Expressway
Operating secondary smelter of metal bearing materials.
Not permitted by DLPC. This site is under a compliance order from the USEPA and has a USEPA interim (Part A) RCRA permit.

8. 03160058 (ID No.) - Chicago/S.C.A. Chemical Services
11700 South Stony Island Avenue
Permit No. 1981-46-DE - Issued 8/10/81.
Permit No. 1981-46-OP (Exp.) Issued 1/24/83

Method of Disposal or Treatment: This is an operating treatment (incinerator or liquid hazardous waste) site. It treats nearly all types organic wastes, including oils, solvents, PCBs, etc. The residual wastes from this process are sent to a permitted disposal site in Indiana.

Description of Past/Present Violations: The site is in general compliance with its permit. However, the facility was cited on July 11, 1983 for not promptly reporting a small spill (leakage of 40 gallons of waste material) on or about June 7, 1983.

Qualitative Assessment of Operation: Site is in general compliance with rules and regulations.

9. 03160033 (ID No.) - Chicago/Paxton II
116th Street and Stony Island Avenue
Permit No. 1978-10-OP and 1978-11-OP - Issued 7/21/78

Method of Disposal or Treatment: This is an operating solid waste and nonhazardous special waste disposal site. The wastes are buried in trenches and covered on a daily basis.

Description of Past/Present Violations: The site is in general compliance with the State rules and regulations and its permit conditions. Prior violations concerned housekeeping and premature activity in nonpermitted areas.

Qualitative Assessment of Operation: The site is operating in general compliance with rules and regulations.

10. 03160002 (ID No.) - Chicago/Paxton
116th Street and Paxton Avenue
Permit No. 1971-23 - Issued 6/28/71

This is a closed (in 1978) and covered general refuse and special waste landfill.

11. 03160051 (ID No.) - Chicago/Chem-Clear
Stony Island Avenue and Butler Drive
Permit No. 1980-36-DE - Issued 10/27/80
Permit No. 1980-36-OP - Issued 10/22/81

Method of Disposal or Treatment: The treatment system consists principally of a chemical process for removal of heavy metals and suspended solids and a controlled environment activated sludge biological reduction process for removal of residual organics from aqueous waste streams.

Description of Past/Present Violations: At present, the site is in general compliance. Past violations involved minor housekeeping problems and paper work violations.

Qualitative Assessment of Operation: The site is operating in general compliance with rules and regulations.

12. 03160027 (ID No.) - Chicago/L.H.L. No. 2
117th Street and Oglesby Avenue
Permit No. 1975-47-DE - Issued 6/23/75
Permit No. 1975-47-OP - Issued 7/18/77

This is a closed (in 1978) and covered general refuse and special waste site.

13. 03160013 (ID No.) - Chicago/Calumet Harbor Development
118th Street and Oglesby Avenue
This is a closed and covered general refuse and special waste landfill.
Not permitted by DLPC - not operating.

14. 03160031 (ID No.) - Chicago/Alburn Incinerator
2200 East 119th Street
Temporarily closed hazardous waste incinerator. Bankrupt - USEPA cleanup.
Not permitted by DLPC - not operating

15. 03160035 (ID No.) - Chicago/U.S. Drum Disposal
119th Street and Yates Avenue
Illegal special and hazardous waste storage-transfer facility.
Not permitted by DLPC - the IEPA and the Illinois Attorney General are parties in litigation for this site.

16. 03160034 (ID No.) - Chicago/Land and Lakes No. 3
122nd Street and Stony Island Avenue
Permit No. 1978-2-DE - Issued 1/10/78
Permit No. 1978-2-OP - Issued 9/2/78

Method of Disposal or Treatment: This is an operating general refuse and special waste disposal landfill utilizing the trench method of disposal.

Description of Past/Present Violations: Several years ago, there was a problem with contaminated surface drainage; depth of daily cover and blowing litter is a recurring problem.

Qualitative Assessment of Operation: Except for periodic problems with depth of daily cover and blowing litter, the site is operating in general compliance with rules and regulations.

17. General - Chicago/119th Street and Paxton Avenue
    Illegal special waste disposal site.
    Not permitted by DLPC - the IEPA and the Illinois Attorney General are parties in litigation for this site.

18. 03160012 (ID No.) - Chicago/Avenue "O" and 118th Street
    Closed illegal random dump.
    Not permitted by DLPC.

19. 03160026 (ID No.) - Chicago/William H. Powers
    State line and north Wolf Lake Boundary.
    Solid waste disposal. Concrete and rock fill for erosion control.
    Not permitted by DLPC - this type of filling operation does not come under the purview of the DLPC permit program.

20. 03160048 (ID No.) - Chicago/MSD No. 4
    122nd Street and Oglesby Avenue
    Operating municipal wastewater treatment sludge drying facility.
    Not permitted by DLPC - this type of facility does not come under the purview of the DLPC permit program.

21. 03160022 (ID No.) - Chicago/U.S. Scrap
    Chicago and Western Indiana Railroad and 122nd Street
    Closed illegal hazardous disposal site.
    Not permitted by DLPC - the IEPA and the Illinois Attorney General are parties in litigation for this site.

22. 03160021 (ID No.) - Chicago/MSD No. 3
    125th Street and Doty Avenue
    Municipal wastewater sludge drying facility.
    Not permitted by DLPC - this type of facility does not come under the purview of the DLPC permit program.

23. 03160030 (ID No.) - Chicago/CID No. 2
    134th Street and Calumet Expressway
    Permit No. 1979-10-DE - Issued 3/12/79.
    Permit No. 1979-10-OP - Issued 6/8/79.

Method of Disposal or Treatment: This is an operating general refuse and special waste disposal landfill. The site accepted hazardous waste for co-disposal prior to January 26, 1983 (the effective date of RCRA hazardous waste disposal regulations). This site has also obtained a NPDES permit for uncontaminated surface drainage.

Description of Past/Present Violations: Intermittent odor complaints occur and are reported from both CID No. 1 and this site.

Qualitative Assessment of Operation: The site is operating in general compliance with rules and regulations.

24. 03103901 (ID No.) - Calumet City/CID No. 1
138th Street and Calumet Expressway
Permit No. 1974-39-DE - Issued 6/4/74
Permit No. 1974-39-OP - Issued 2/14/75

Method of Disposal or Treatment: This is an operating treatment and disposal site for hazardous waste. The treatment process consists of storage, blending, acid neutralization, dewatering and pug milling for solidification of hazardous wastes. The disposal of the treated waste is in lined trenches located on the south side of the site.

Description of Past/Present Violations: A large portion of this site is a closed and covered general refuse and co-disposal (special and hazardous waste) site. Intermittent odor complaints occur at both this site and CID No. 2.

Qualitative Assessment of Operation: The site is operating in general compliance with rules and regulations.

25. 03160005 (ID No.) - Chicago/Land and Lakes No. 1
138th Street and Cottage Grove Avenue
Permit No. 1971-27 - Issued 8/9/71.
*See site 26 for discussion.

26. 03160028 (ID No.) - Chicago/Land and Lakes No. 2
138th Street and Cottage Grove Avenue
Permit No. 1975-46-DE - Issued 6/20/75.
Permit No. 1975-46-OP - Issued 7/16/76.

Sites 25 and 26 are adjacent and operated as one facility by the owner.

Method of Disposal or Treatment: These are operating solid and special waste disposal landfills.

Description of Past/Present Violations: Thickness of daily cover has been inadequate from time to time, fugitive dust and blowing litter have been observed, and sewage sludge has been used to supplement intermediate cover to an excessive degree.

Qualitative Assessment of Operation: This site moves in and out of compliance with respect to cover thickness, dust, litter, etc. It is receiving routine inspection and oversight by the Agency.

27. 03106905 (ID No.) - Dolton/Cottage Grove Landfill
138th Street and Cottage Grove Avenue
Permit No. 1976-24-DE - Issued 6/17/76
Permit No. 1976-24-OP - Issued 6/27/77

This is a closed solid waste landfill; no special or hazardous waste was permitted.

28. 03106906 (ID No.) - Dolton McKesson
138th Street and Cottage Grove Avenue
Permit No. 1981-37 DE - Issued 7/8/81
Permit No. 1981-37 OP - Issued 10/13/81

Method of Disposal or Treatment: This is a waste treatment facility that reclaims ketones, esters, ethers, alcohols, aliphatic and aromatic hydrocarbons from paint wastes.

Description of Past/Present Violations: On 4/14/83, in loading a transport tanker, overfilling of distilled lacquer thinner resulted in a 200 gallon spill. The spill was contained and removed within one hour.

Qualitative Assessment of Operation: The site is in general compliance with rules and regulations. In the past, manifest "paper violations" have occurred as well as problems with the spill reports associated with tanker loading.

29. 03106903 (ID No.) - Dolton/Land and Lakes
138th Street and Cottage Grove Avenue
Permit No. 1975-43-DE - Issued 6/13/75
Permit No. 1975-43-OP - Issued 7/19/77

Method of Disposal or Treatment: This is an operating solid and special waste landfill utilizing the trench method for disposal.

Description of Past/Present Violations: Past inspections have shown inadequacy of daily cover from time to time. Also, fugitive dust (fly ash) and blowing litter have been problems.

Qualitative Assessment of Operation: This site is in and out of compliance with respect to depth of cover, dust, litter, etc. It is receiving routine inspections and oversight by the IEPA.

30. 03106901 (ID No.) - Dolton/Municipal
Lake Cottage and Cottage Grove Avenue
Closed and covered municipal landfill.
Not permitted by DLPC.

31. 03160039 (ID No.) - Chicago/Calumet Container
136th Street and State Line Road
Temporarily closed hazardous waste treatment and disposal site.
Not permitted by DLPC.

4.2 A Geologic Summary of the Lake Calumet Area

The study area lies in the physiographic area known as the Chicago Lake Plain, which was at one time the bottom of glacial Lake Chicago (Figure 4.2). In terms of erosional surfaces, the lake plain is very youthful, as can be seen on the Lake Calumet Quadrangle map by the few streams and many swamps.

About 13,500 years ago, when the glaciers were slowly retreating north from the Chicago area, the meltwater from the glaciers created a large lake (eventually called Lake Chicago). This lake covered most of what is today the City of Chicago, and it was this lake that created the flatness of the present topography. Glacial moraines lying in crescentric ridges to the west and south provided a natural dam for the meltwater (Figure 4.3).

From wave cut ridges and beach deposits, geologists found three distinct remnant shorelines: the oldest, called the Glenwood stage, was 55 feet above the present lake level; the Calumet stage was 35 feet; and the Toleston stage was 20 feet above. Between each of these stages were corresponding low-water stages, which can be seen by the swamp and sand-filled stream channel deposits overlain by lake bottom clays and beach deposits (Figure 4.4).

Prior to Lake Chicago, great ice sheets covered the land. The tills (deposits of glaciers) found in the Chicago area are almost entirely Wisconsin in age. Although there is evidence of two previous glaciations, the Illinoian and possibly the Kansas, deposits of either of these advances cannot be found in Chicago. Thickness of these unconsolidated deposits ranges between 60-70 feet in this area.

Below the glacial deposits lies the bedrock surface, with its undulating plain and steep sloped valleys, some as much as 100 to 150 feet deep (Figure 4.5). The surface is fresh and unweathered under the unconsolidated glacial debris. The glaciers completely obliterated the bedrock, and rarely are the slopes of the bedrock parallel with the slopes of the present topography. Prior to the Ice Age, this area went through an extensive time period of erosion. This is evident from the fact that no rocks of the Tertiary, Cretaceous, Jurassic, Triassic and Permian ages exist in this area. Rocks of Pennsylvanian, Mississippian and Devonian are also missing in this area but are present in the fault blocks of the Des Plaines Disturbance.

The bedrock in Chicago is Silurian in age (Figure 4.6). During this time period, inland seas covered much of North America from the Gulf of Mexico to the Arctic Ocean. These seas left great deposits of limestone, which later altered to dolomite. The Silurian ranges in thickness between 230 and 500 feet.

Below the Silurian rocks lie the dolomites and sandstones of the Ordovician. The Ordovician rocks, like the Silurian, are all marine sediments. The thickness of the rock from this period ranges from 700 to 1,100 feet.

The thickest deposits are the rocks of the Cambrian System ranging from 3,000 to 4,000 feet thick. These rocks are also marine in origin. The upper half is dolomite, sandstone and siltstone, and the lower half is mostly sandstone and includes the Mt. Simon Formation.

Underlying all of the above are the oldest rocks of the Earth, the Precambrian rocks, ranging in age from 1 to 1.5 billion years old. Depth of the Precambrian rocks in the Chicago Loop area is approximately 4,500 feet. These rocks were identified from borings in the Joliet area as a red granite.

A major structural feature is the Kankakee Arch and, as a result of this structure, the strata in the Chicago area gently dip to the east. This tectonic movement also produced some local anticlinal and synclinal structures with east - west axes (Figure 4.7).

Most of the recent geologic changes have been created by man. Calumet Lake once covered an area of approximately three and one-third square miles but, due to marginal filling and channel dredging, has shrunken considerably in recent times. Filling of the land by local industries was indicated by the slag deposits noted in the boring logs resulting from this study. Many of the swamps have been drained and filled and large extensions of the land along Lake Michigan are also man-made.

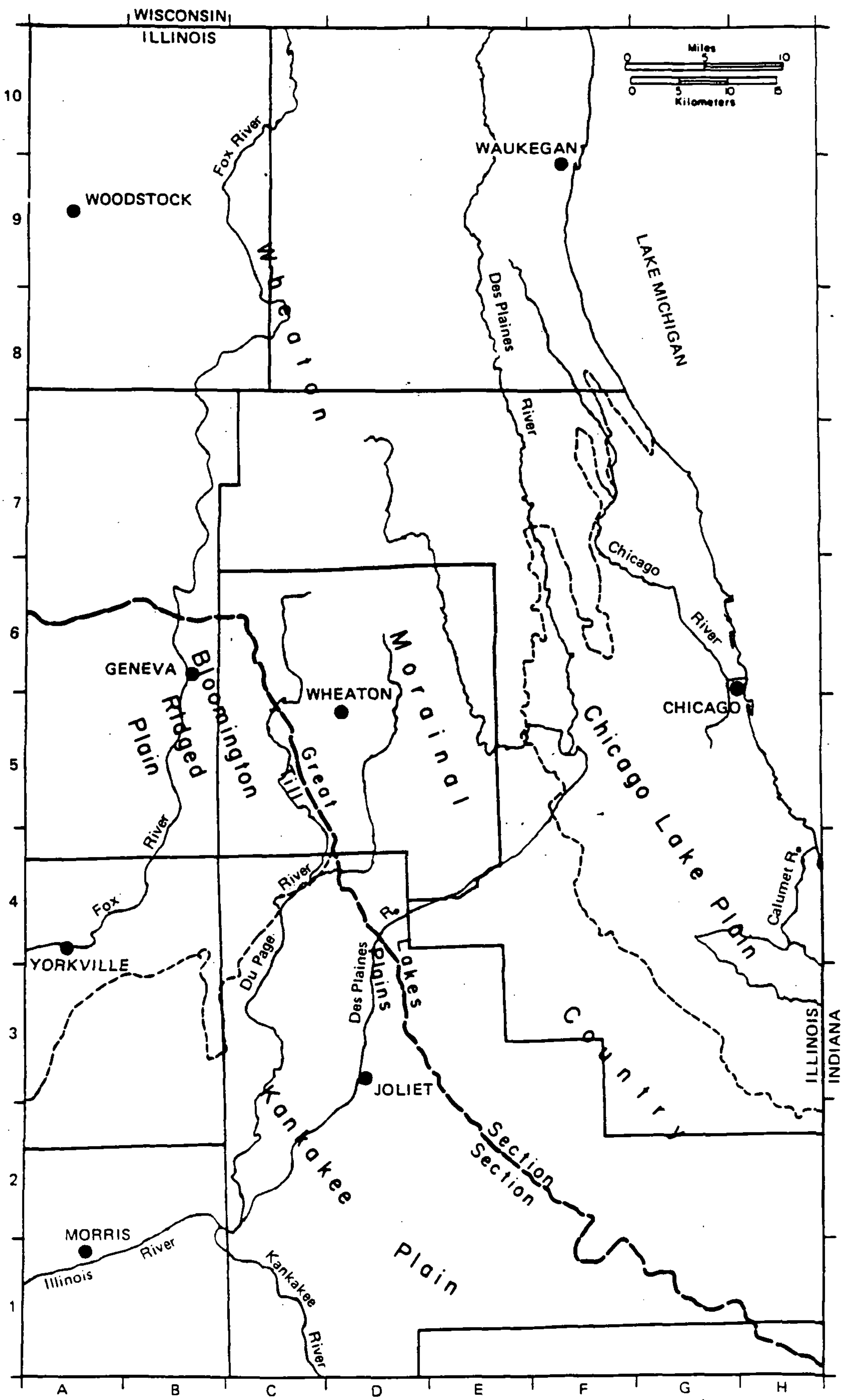


FIGURE 4.2

Physiographic Division in the Chicago Area
(Willman, Ill. Geol. Survey, Circular 460,
fig. 22, p. 62, 1971)

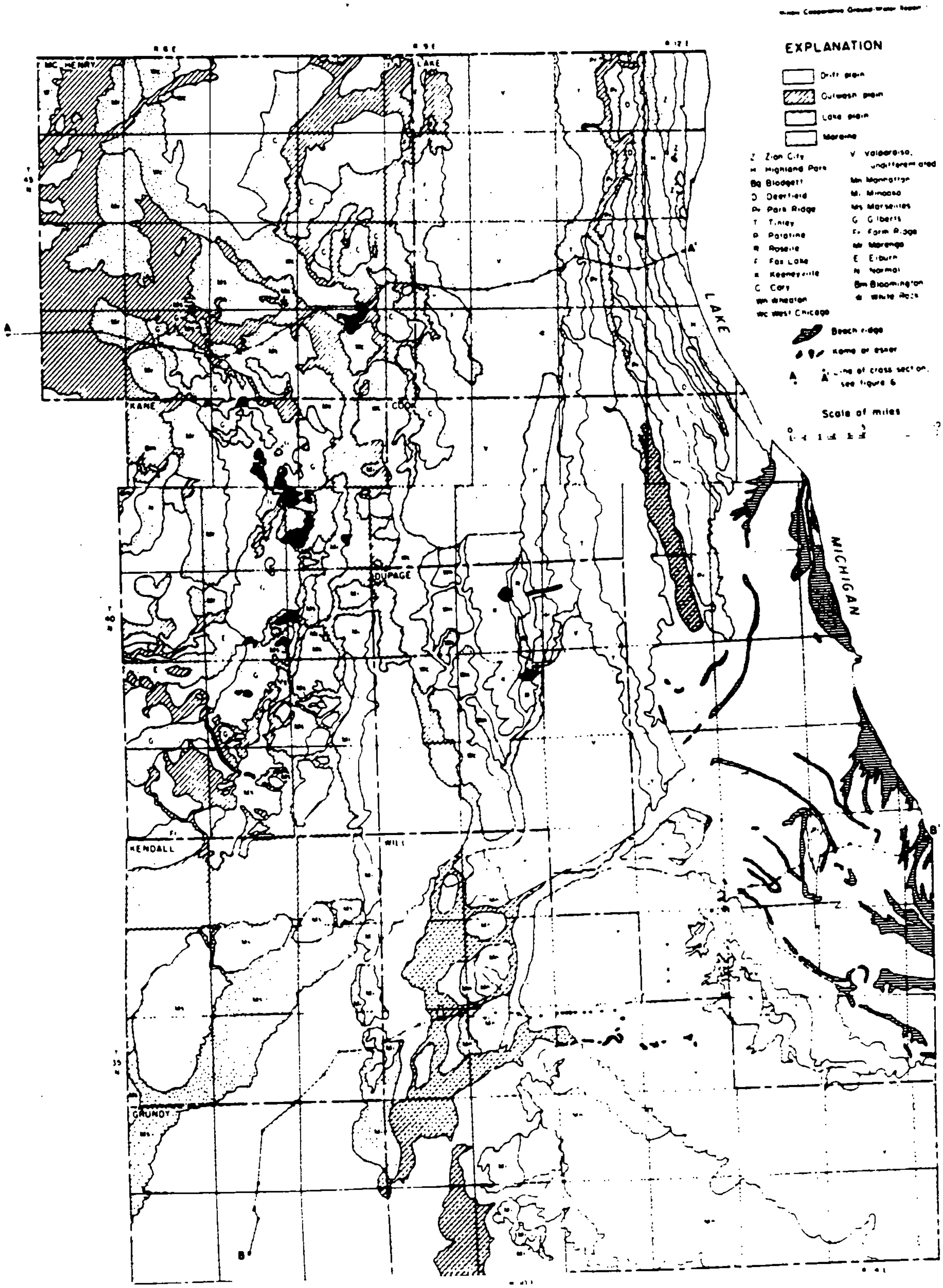


FIGURE 4.3

Glacial Geology of Northeastern Illinois

George E. Ekblaw - 1959

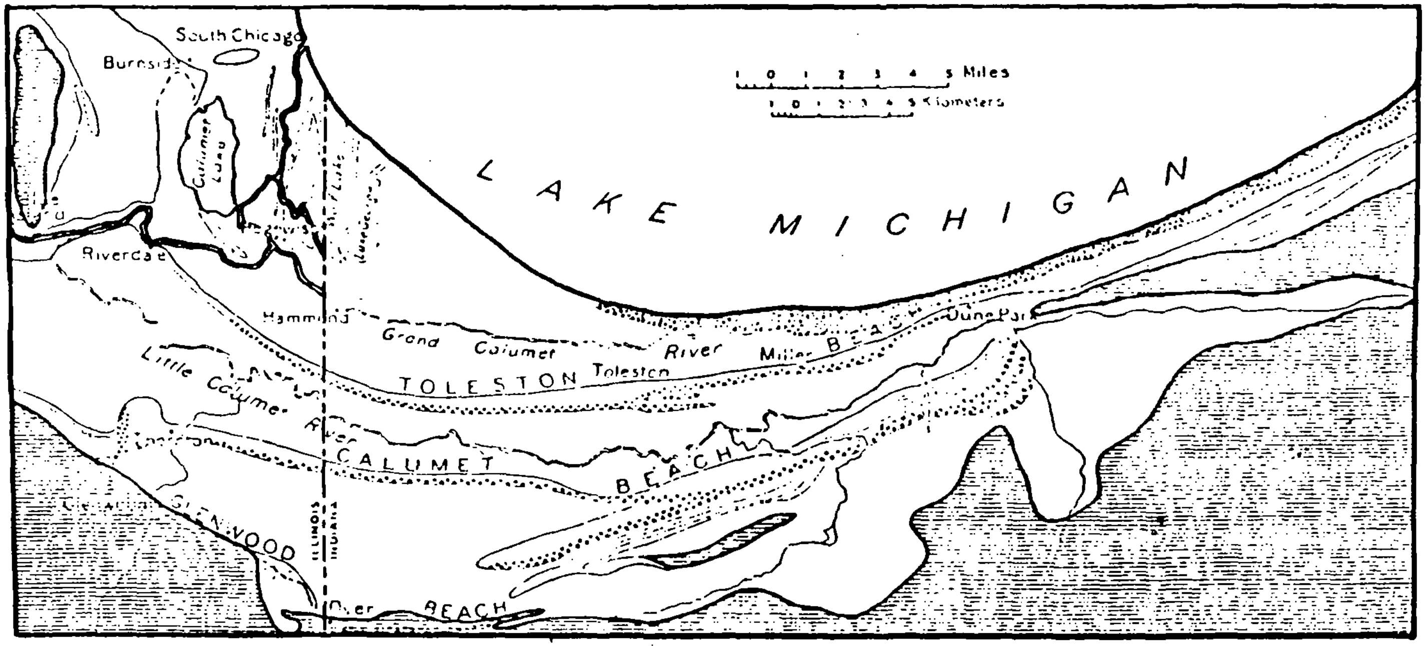


FIGURE 4.4

Remnant Shorelines near the Calumet River (Bretz, Ill. Geol. Survey, Bull. 65, Part 1, fig. 31, p. 41, 1939)

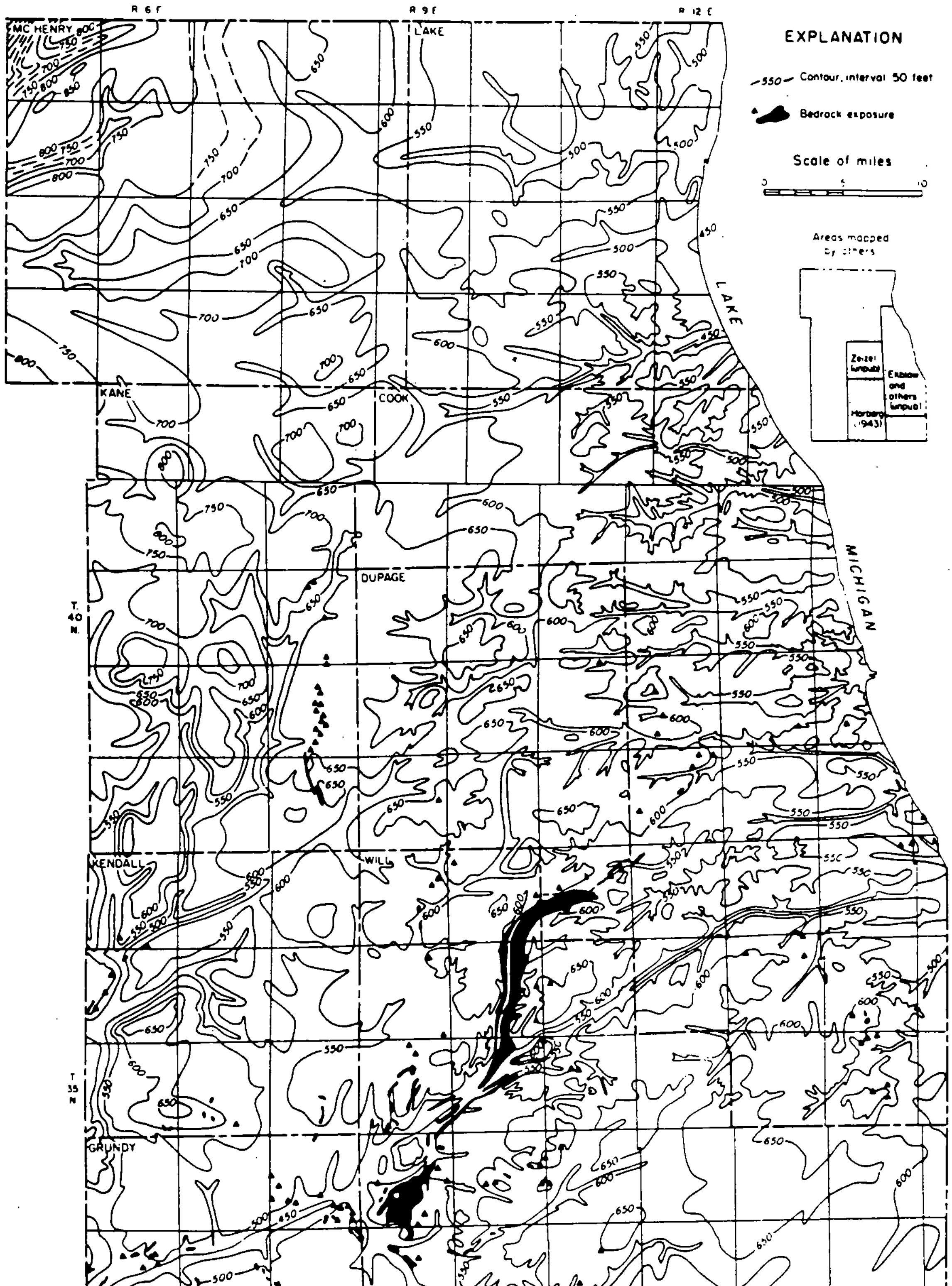
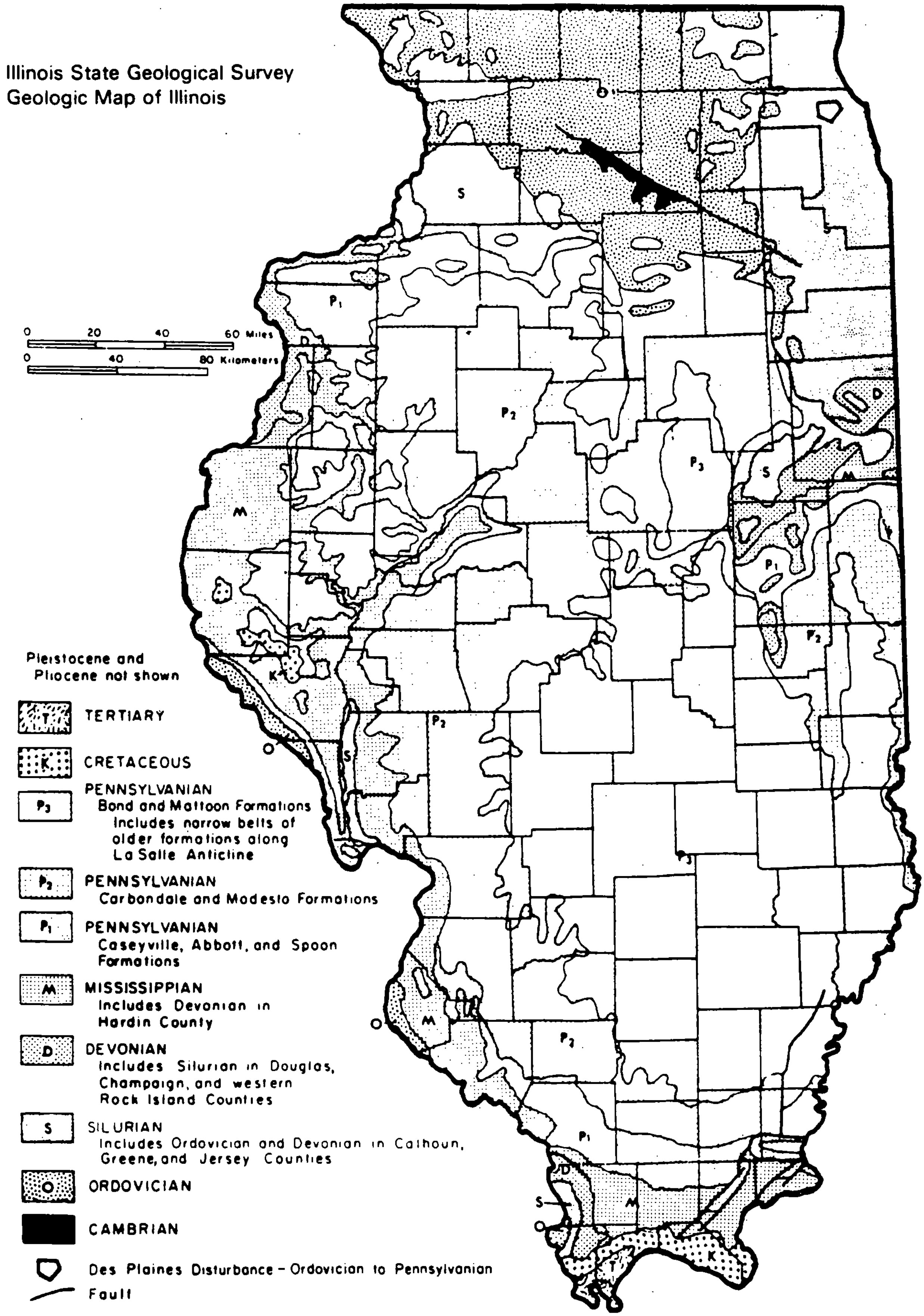


FIGURE 4.5

Bedrock Surface - Chicago Area
(Suter et al., Cooperative Ground-Water Report 1, fig. 13, p. 20, 1959)



Illinois State Geological Survey
Geologic Map of Illinois
0 20 40 60 Miles
0 40 80 Kilometers
Pleistocene and Pliocene not shown
T TERTIARY
K CRETACEOUS
P3 PENNSYLVANIAN Bond and Mattoon Formations Includes narrow belts of older formations along La Salle Anticline
P2 PENNSYLVANIAN Carbondale and Modesto Formations
P1 PENNSYLVANIAN Caseyville, Abbott, and Spoon Formations
M MISSISSIPPIAN Includes Devonian in Hardin County
D DEVONIAN Includes Silurian in Douglas, Champaign, and western Rock Island Counties
S SILURIAN Includes Ordovician and Devonian in Calhoun, Greene, and Jersey Counties
O ORDOVICIAN
CAMBRIAN
Des Plaines Disturbance - Ordovician to Pennsylvanian
Fault

FIGURE 4.6

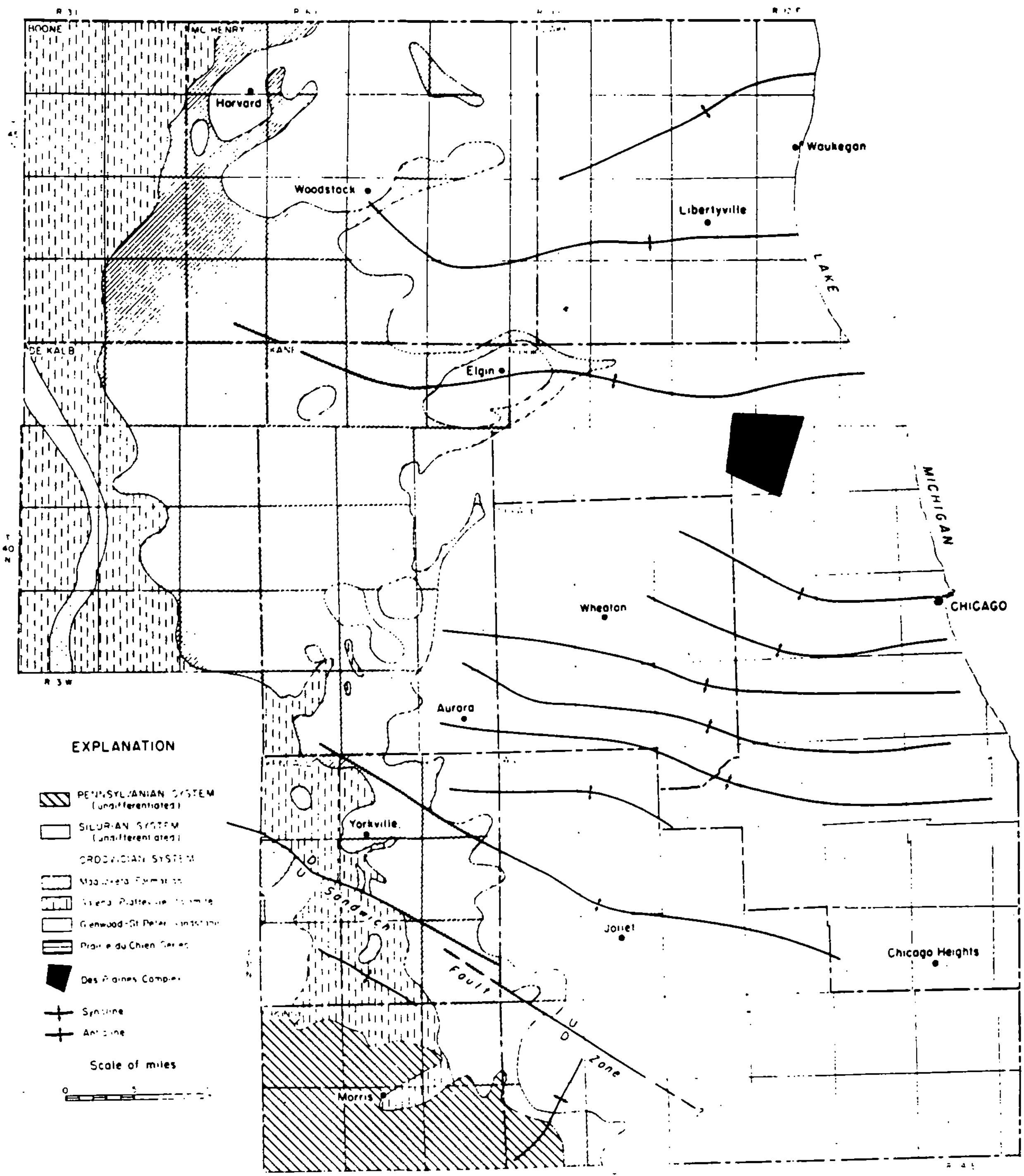


FIGURE 4.7

Areal Geology of the Bedrock Surface and Major Structures in the Chicago Region (Suter et al., Cooperative Ground-Water Report 1, fig. 16, p. 23, 1959)

There are four aquifer systems in this area: 1) sand and gravel deposits of the glacial drift; 2) shallow dolomite formations, mainly of Silurian age; 3) the Cambrian-Ordovician Aquifer; and 4) the Mt. Simon Aquifer of the lower Cambrian (Figures 4.8 and 4.9). The glacial drift and the shallow dolomite aquifer are hydrologically connected and this aquifer is separated from the Cambrian-Ordovician Aquifer by the less permeable shales of the Maquoketa Formation. The fine grained glacial tills and lake sediments in this area do not produce sufficient groundwater for wells. However, the sand and gravel outwash deposits can produce adequate quantities, the most productive being found in the bedrock valleys.

4.3 Alternatives to Landfilling

In the near term (10-15 years), there will always be a need for landfills as the ultimate repository for certain wastes and for the residues that remain after wastes have been treated. Wastes may be treated for volume reduction, may be rendered innocuous by neutralization or detoxified by physical, biological or chemical processes, and may be treated to produce phase changes such that portions are converted into gases, liquids or concentrated solids. Even though wastes are subjected to one or more treatment methodologies, some substance will remain (perhaps in a different form) that requires further handling and ultimate disposal.

SYSTEM	SERIES	GROUP OR FORMATION	HYDROLOGIC UNITS	LOG	THICKNESS (FT.)	DESCRIPTION
Quaternary	Pleistocene		Glacial drift aquifers		0-350+	Unconsolidated glacial deposits - pebbly clay (till), silt, and gravel. Alluvial silts and sands along streams.
Pennsylvanian		Carbondale Tradewater			0-175	Shale; sandstones, fine-grained; limestones; coal; clay.
Mississippian	Kinderhook				0-365	Shale, green and brown, dolomitic; dolomite, silty.
Devonian					0-25	Shale, calcareous; limestone beds, thin.
Silurian	Niagaran	Port Byron Racine Waukesha Joliet	Silurian (Shallow dolomite aquifer)		0-465	Dolomite, silty at base, locally cherty.
	Alexandrian	Kankakee Edgewood				
Ordovician	Cincinnatian	Maquoketa	Maquoketa		0-250	Shale, gray or brown; locally dolomite and/or limestone, argillaceous.
	Mohawkian	Galena Decorah Platteville	Galena-Platteville		220-350+	Dolomite and/or limestone, cherty. Dolomite, shale partings, speckled. Dolomite and/or limestone, cherty, sandy at base.
	Chazyan	Glenwood St. Peter	Glenwood-St. Peter (Cambrian-Ordovician Aquifer)		100-650	Sandstone, fine- and coarse-grained; *little dolomite; shale at top.* Sandstone, fine- to medium-grained; locally cherty red shale at base.
	Prairie du Chien	Shakopee *New Richmond* Oneota	Prairie du *Chien*		0-340	Dolomite, sandy, cherty (oolitic); sandstone. Sandstone, interbedded with dolomite. Dolomite, white to pink, coarse-grained, cherty (oolitic), sandy at base.
Cambrian	St. Croixian	Trempealeau	Trempealeau		0-225	Dolomite, white, fine-grained, geodic quartz, sandy at base.
		Franconia	Franconia		45-175	Dolomite, sandstone, and shale, glauconitic, green to red, micaceous.
		Ironton Galesville	Ironton-Galesville		105-270	Sandstone, fine- to medium-grained, well sorted, upper part dolomitic.
		Eau Claire	Eau Claire (upper and middle beds)		235-450	Shale and siltstone, dolomitic, glauconitic; sandstone, dolomitic, glauconitic.
		Mt. Simon	Sandstones Eau Claire (lower) & Mt. Simon (Mt. Simon)		2000±	Sandstone, coarse-grained, white, red in lower half; lenses of shale and siltstone, red, micaceous.
						Precambrian

FIGURE 4.8

Stratigraphy and Water-Yielding Properties of the Rocks and Character of the Ground Water in the Chicago Region

DRILLING AND CASING CONDITIONS	WATER-YIELDING PROPERTIES	CHEMICAL QUALITY OF WATER	WATER TEMPERATURE °F
Boulders, heaving sand locally; sand and gravel wells usually require screens and development; casing required in wells into bedrock.	Sand and gravel, permeable. Some wells yield more than 1000 gpm. Specific capacities from 2.1 to 66 gpm/ft, av. 12 gpm/ft. Coefficient of trans. from 3400 to 100,000 gpd/ft, av. 25,000 gpd/ft.	McHenry County, hardness from 100 to 450 ppm., av. 275. Other counties, see Silurian below and text.	46° min. 52° av. 54° max.
Shale requires casing.	Jointed beds yield small supplies locally.		
	Limited areal extent; not used as aquifer.		
Upper part usually weathered and broken; extent of creviceing varies widely.	Not consistent; some wells yield more than 1000 gpm. Crevices and solution channels more abundant near surface. Specific capacities from 0.1 to 550 gpm/ft. Highest av. specific capacities (54.4 gpm/ft) in Du Page Co. wells, lowest (5 gpm/ft) in Lake Co. Coefficient of trans. averages 100,000 gpd/ft in Du Page Co., 9000 gpd/ft in Lake Co.	Variable. Hardness, <100 to >1000 ppm. Iron >0.3 ppm in 80% of analyses.	54°
Shale requires casing.	Shales, generally not water yielding, act as barriers between shallow and deep aquifers. Crevices in dolomite yield small amounts of water.		
Crevicing common only where formations underlie drift. Top of Galena usually selected for hole reduction and seating of casing.	Where formation lies below shales, development and yields of crevices are small; where not capped by shales, dolomites are fairly permeable.	Hardness < 100 ppm. H_2S often present.	54° to 55°
Lower cherty shales cave and are usually cased. Friable sand may slough.	Small to moderate quantities of water. Trans. probably about 15% of that of Cam.-Ord. Aquif.	Water similar in quality or slightly harder than that in Ironton-Galesville Sandstone.	53° to 56° 56° to 58° (Lake Co.)
Crevices encountered locally in the dolomite, especially in Trempealeau. Casing not required.	Crevices in dolomite and sandstone generally yield small amounts of water. Trempealeau locally well creviced and partly responsible for exceptionally high yields of several deep wells.		
Amount of cementation variable. Lower part more friable. Sometimes sloughs.	Most productive unit of Cam.-Ord. Aquif; trans. probably about 80% its total. Coefficients of trans. and storage of the Cam.-Ord. Aquif. av. 17,400 gpd/ft and 0.00035.	Hardness 200 to 250 ppm in northwest part of area, increasing toward east and south. Iron usually <0.4 ppm.	56° - 58° to 62° - 64°
Casing not usually necessary. Locally weak shales may require casing.	Shales, generally not water yielding, act as barrier between Ironton-Galesville and Mt. Simon.	Water soft in upper 100'; hardness increases downward (4000 ppm at elev. -2100'); chlorides 400 ppm at elev. -1600', increase at rate of 400 ppm each additional 25' depth.	66° at elev. -1300', increasing 1° with each additional 100' depth. Influenced by water from upper formations.
Casing not required.	Moderate amounts of water; permeability intermediate between that of Glenwood-St. Peter and Ironton-Galesville.		
crystalline rocks			

FIGURE 4.8 (CONTINUED)

(Suter et al., Cooperative Ground-Water Report 1, 1959)

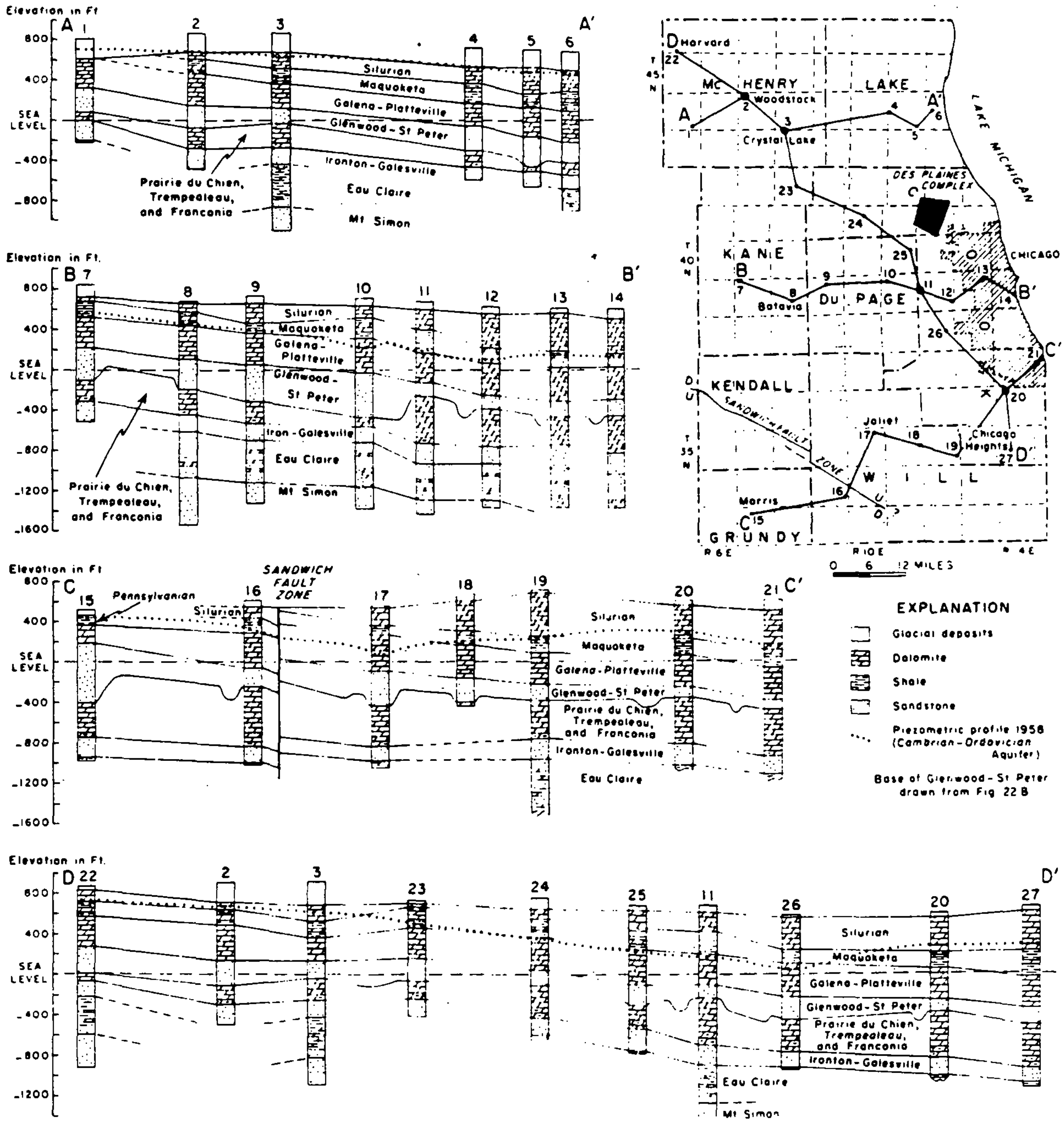


FIGURE 4.9

Cross Sections of the Structure and Stratigraphy of the Bedrock and Piezometric Profiles of the Cambrian-Ordovician Aquifer in the Chicago Region (Suter et al., Cooperative Ground Water Report 1, fig. 15, p. 22, 1959)

The residues of other treatment systems are examples. Sludge results from the operation of municipal wastewater treatment plants and from industrial waste pretreatment works. The sludges may be dewatered, concentrated by chemical or drying techniques or even incinerated, but some residue, solid, ash (in the case of incinerators), or a gaseous waste stream and another sludge from a scrubber will result. These residues require further handling and disposal.

The above is also true for industrial waste treatment processes and for air pollution control devices and facilities. Sludges, dusts, ash, condensed fumes, vapors and entrained gases that result from treatment and collection require further handling and ultimate disposal.

The quantities and characteristics of wastes that are permitted to be ultimately landfilled may be limited and controlled to varying degrees and, thus, their potential as a threat to human health or to the environment can be minimized. Examples include the following:

1. In-plant industrial process changes.

    a. Substitution and use of nonhazardous or less hazardous feedstocks or chemicals.

    b. Adoption of waste management strategies that concentrate, reuse and/or segregate waste streams with separate management of the hazardous, reusable or difficult to landfill components.

2. Waste recovery and reuse.

    a. Solvent, oil and other materials recovery and reclamation for reuse.

    b. Recovery of heat value of certain wastes for steam generation and/or electrical energy production in boilers and for firing industrial furnaces.

    c. Improved collection, pretreatment and reuse of valuable waste components. The recovery of chrome from metal plating baths and sludges is an example.

    d. Separate collection and specialized recovery of other valuable waste components.

3. Regulatory preclusion of mobile or problem wastes (liquids) from landfill disposal where alternate technologies are available.

4. Specialized industrial waste treatment.

   a. Volume reduction by dewatering and solidification techniques with treatment and discharge of excess liquids to sewers with approved permits.

   b. Neutralization of acid or alkaline wastes.

   c. Detoxification by chemical/physical treatment, volume reduction and separate handling of the resulting solid and liquid waste stream.

   d. Volume reduction, destruction of hazardous organics and elimination of the liquid component by incineration.

5. Specialized waste treatment to facilitate disposal such as stabilization/solidification processes that decrease solubility and retard leaching.

There are variations on each of the above processes, and many are being used by generators (manufacturers and service industries) and the waste management facilities located within or served by sites in the study area. For example, hazardous waste sites do not accept wastes for disposal that contain free liquids. Liquid wastes must have been previously treated or solidified or retained within absorbants prior to disposal. Thus, their mobility, leachability and pollution potential have been greatly reduced.

An incinerator (SCA Chemical Services, Inc.) having a destruction/removal efficiency of 99.99 percent for toxic organics that has been permitted by both the USEPA and the IEPA is in operation in the study area. In addition to the destruction of toxic organics, a waste volume reduction to about one tenth of the original occurs. The residual is an ash and scrubber sludge. The facility can incinerate approximately 12.5 million gallons of specified wastes per year.

The majority of spent solvents that formerly were discarded is now separately collected and reclaimed for reuse. Several solvent recovery facilities (thin wall evaporation or other distillation processes) in Cook County annually recover over 3 million gallons of spent solvents for reuse in industry. Some of the custom recovery facilities are able to distill and reconstitute exotic and frequently expensive organic compounds to original specifications. The distillation bottoms that result from the recovery of spent solvents may be further treated in an environmentally safe manner by incineration.

Several waste treatment facilities have been established to address aqueous wastes (over 90 percent water) that have frequently been landfilled in the past. Chemical and physical treatment processes are employed to neutralize, coagulate, precipitate, filter and otherwise concentrate the hazardous components into a filter residue that comprises less than 10 percent of the original volume and which may be safely landfilled. The treatment processes are sufficient to allow the resulting filtered liquids to be discharged to the sewage system. Oil-water separation equipment may also split off a separate oil/grease component that is collected for recovery and reuse. Specialized treatment may result in a detoxification or chemical alteration of the resulting filter residue so that it no longer has any hazardous properties and it may be further managed at other than hazardous waste facilities.

In 1982, approximately six million gallons of aqueous hazardous waste were treated by these methods in the study area.

Waste oils have caused major environmental problems when applied to land in the past. In the Chicago area, most of the waste oils that are managed off-site are re-refined into usable lubricants. The largest used oil refiner in the United States is located just west of Chicago and annually recovers over 10 million gallons of used oil for reuse as lubricants. Much of the remainder is also separately collected but transported to permitted facilities where it is blended with other high BTU value wastes (such as mixed solvents, distillation bottoms, and paint waste residues) into supplemental fuels that are burned in industrial furnaces or boilers in manufacturing plants, steel mills and asphalt plants.

The IEPA has been actively encouraging recycling, reuse, treatment and incineration of waste and discouraging land disposal of certain hazardous wastes such as those containing free liquids, halogenated and other organics, and extremely toxic substances. Incentives to treat and recover and disincentives to landfill are economic and regulatory. As an example, the hazardous waste disposal fee is not applicable to those wastes that are recovered for reuse but has recently been increased threefold for hazardous wastes that are landfilled.

In Illinois, a waste management facility must obtain a supplemental permit for each waste stream that it handles for each generator. A rigorous and frequently time consuming review is made by IEPA staff of each application and each one must be renewed on a periodic basis. Recently, the IEPA introduced the generic waste stream permit authorization program. Under this program, permitted waste management facilities may accept specified waste streams from any registered generator without first having to secure the supplemental permit if the waste is to be beneficially recovered, treated or incinerated. Generic waste stream authorization has given a competitive edge to waste treatment and recovery facilities and the percentage of total wastes that are managed off-site is increasing.

The waste of one company may be used as a raw feedstock in the manufacturing operation of another. Similarly, alkaline wastes of company A could be used to neutralize acidic wastes from company B. Specific waste streams, even in small quantities, such as used oils and spent solvents, can be combined with other similar small waste streams to make recovery and reuse economically feasible. They may also be blended into fuels for recovery of their BTU content. Waste exchanges are mechanisms whereby usable wastes from one industry may be matched for possible use by another industry.

The Illinois Industrial Materials Exchange Service has been operated cooperatively by the IEPA and the Illinois State Chamber of Commerce since April of 1981. It publishes a bi-monthly listing of specific categories of wastes and surplus products that are available for exchange and a listing of waste or off-specification products that are wanted or usable by other facilities. Its purpose is to encourage the recovery and reuse of valuable components of waste, to conserve valuable resources (many of which must be imported) and to reduce the quantity of wastes (many of which may cause environmental degradation or pose a threat to human health) that are land disposed. In its first two years of operation, approximately 7 million gallons of mostly hazardous waste were been recovered for reuse through use of the exchange. The disposal and material purchase costs that were avoided total over $860,000 for that period.

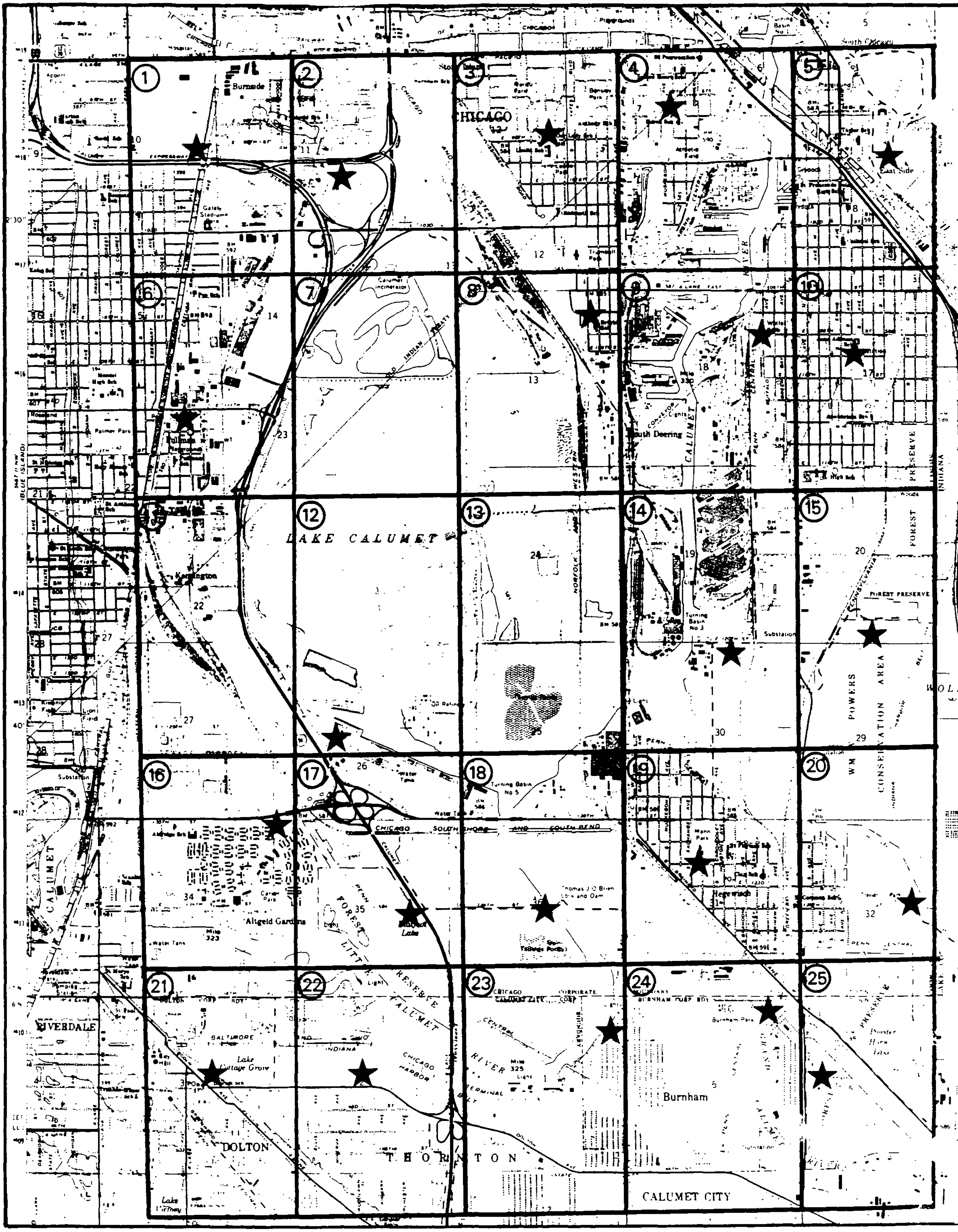
In 1980, over 80 percent of the hazardous wastes in Illinois managed off the site of generation was landfilled and less than 20 percent was recycled, treated or incinerated. For 1983, it is estimated that only 40 percent will be landfilled and 60 percent recycled, treated or incinerated. There will be an increasing need for treatment and recycling facilities and decreasing dependence upon landfill sites.

4.4 Land Pollution Sampling Program in the Study Area

As part of this study, the Division of Land Pollution Control (DLPC) conducted a detailed soil and groundwater sampling program in the study area. The area was divided into grids encompassing approximately equal areas. Within the established geographic grid (Figure 4.10), a representative site was chosen for sampling (Table 4.1). Both soil and groundwater samples were taken for study. Drilling logs for the sampling are contained in Appendix C.

4.4.1 Drilling and Sampling Methodology

The IEPA's CME 55 Drill Rig, with a 3-1/4 inch inner diameter hollow stem auger, was used for the entire study. Within the auger, either a primary or secondary sampling device was used to retrieve soil specimens for geologic interpretation and soil sampling.



★ Sampling Locations

FIGURE 4.10 Sampling Grid for Soil and Groundwater Samples, South Chicago Study Area

Table 4.1

Locations of Soil and Groundwater Bore Holes

Grid Numbers	Site
1	Chicago State University
2	Olive Harvey College
3	Luella Playground School
4	Veterans Memorial Park
5	Calumet Park
6	Pullman Park
7	*
8	Bright School
9	Wolfe Playground Park
10	Addams Elementary School Playground
11	*
12	Chicago Port District
13	*
14	Republic Steel
15	Wolf Lake Conservation Area
16	New Carver High School
17	Beaubien Forest Preserve
18	Thomas J. O'Brien Lock and Dam
19	Mann Park
20	Wolf Lake Conservation Area
21	Lincoln Avenue Grade School
22	John W. Needles Park
23	Hoxie Tot Lot
24	Burnham Park
25	Burnham Woods Golf Course

*Unable to drill due to landfilling or Lake Calumet

The primary sampler is a unique device known as the CME Continuous Sampler, which consists of a 3-inch diameter split tube with a tapered cutting head. This allows retrieval of a 2-1/4 inch nearly undisturbed continuous sample up to 5 feet long.

The secondary sampler, a Standard Lynac Split Spoon, was only used when geologic conditions would not allow use of the primary device. This device is also a split tube, although only 2 inches in diameter, and it retrieves a 1-3/8 inch disturbed soil sample up to 18 inches long. This sample method is in accordance with ASTM Standard D-1586.

Upon removal from the split tubes, the soil sample is sliced along its entire length. Readings taken with an organic vapor analyzer (OVA) along the split sample as well as at the bore hole, would allow determinations of where to take organics samples. Samples were taken for metals analysis at regular intervals of 0 to 6 inches, 6 inches to 2 feet, and 2 feet to 10 feet.

When the desired depth was achieved and groundwater encountered, a 2-inch PVC threaded pipe with a 2-foot no. 10 (.01 inch) slotted screen was installed. Several volumes of water were bailed from the hole using a teflon bailer. Water samples for entire organics scan, including volatile organics, were bailed. Also, a water sample for metals analysis was pumped and field filtered. All samples were labeled, preserved in accordance with IEPA laboratory procedures, and iced in coolers for proper storage.

Upon completion of the sampling, the PVC pipe and screen were retrieved and the bore hole was filled in with cuttings. All drilling tools, sampling tools, PVC pipe, screen, and teflon bailer were cleaned using high pressure hot water between bore hole locations.

4.4.2 Chemical Analysis of Metals in Soils

4.4.2.1 Introduction

There are no formal standards for metals in soils, only ranges and means of metal concentrations found in soils. These ranges and means are based on samples taken from various localities around the world. The concentration of trace metals and trace elements can vary from site to site because soil chemistry varies due to differences in climate, vegetation, topography, geographic location (industrial versus agricultural), and the geologic parent material. Though these ranges and means are not applicable to this specific locale, they can provide a method of spotting any gross soil contamination.

In many of the borings, fill material was encountered, in which case the soil ranges are not a valid means for comparison. When analyzing the data, a check of the boring log description will indicate if the material tested was fill or natural.

Table 4.2

Summary of Metals in Soil (ppm)
(Taken from Data in Appendix A for 21 Sampling Sites)

Contaminant	0-6" depth	6"-2' depth	2'-10' depth
Arsenic			
Mean	8.3	11.2	5.4
Highest	16.0	80.0	17.0
Lowest	2.4	0.7	1.5
Barium			
Mean	86.0	82.5	58.9
Highest	250.0	450.0	462.0
Lowest	<25.0	<2.5	<2.5
Cadmium			
Mean	<3.0	<2.5	<2.5
Highest	13.2	-	-
Lowest	<2.5	-	-
Chromium			
Mean	19.5	14.0	7.6
Highest	2500.0	77.5	21.0
Lowest	5.0	<2.5	<2.5
Copper			
Mean	31.4	18.8	11.9
Highest	95.0	52.5	45.0
Lowest	3.8	<2.5	<2.5
Iron			
Mean	18,902.2	17687.7	10,923.1
Highest	174,518.0	83,699.0	31,685.0
Lowest	6,088.0	3,919.0	4,095.0
Lead			
Mean	114.4	52.2	44.0
Highest	657.0	294.2	576.0
Lowest	33.0	<7.5	<7.5
Manganese			
Mean	657.0	1323.2	424.4
Highest	32,600.0	9250.0	2325.0
Lowest	135.0	42.5	175.0
Mercury			
Mean	0.08	0.07	0.03
Highest	0.27	0.29	0.24
Lowest	0.01	0.01	0.01
Nickel			
Mean	25.6	28.9	26.2
Highest	162.5	75.0	42.5
Lowest	<25.0	<25.0	<25.0
Selenium			
Mean	0.58	0.55	0.47
Highest	2.10	4.00	5.20
Lowest	0.20	0.10	<0.10

The laboratory test used to analyze the metal content is called an acid digest. This test gives the total metal concentration in a soil and does not indicate the amount of free or soluble metals present (which is needed to determine the toxicity of the soils).

At Grids No. 14 and 15, the regular sampling intervals were not taken due to difficulties in drilling through slag deposits. Instead, samples were taken from 5' to 6-1/2' and 6-1/2' to 9-1/2' at Grid No. 14, and 1-1/2' to 5' and 5' to 10' at Grid No. 15. All four of these samples fell within the normal soil metal content range for the various metals. Copies of the analysis for these irregular intervals are included in this report.

The results of the chemical analyses of metals in the soil samples are presented in Appendix A.

The following table (Table 4.2) summarizes the chemical analyses of metals in the soil samples taken in the study area.

Table 4.2 (Continued)

Summary of Metals in Soil (ppm)

Silver			
Mean	<2.50	2.7	<2.5
Highest	3.80	5.0	<2.5
Lowest	<2.50	<2.5	<2.5
Zinc			
Mean	186.1	73.1	56.7
Highest	550.0	220.0	340.0
Lowest	32.5	2.5	17.5

4.4.2.2 Discussion of Results of Chemical Analysis of Metals in Soils (see Appendix A)

Arsenic

Arsenic is found in all soils with the natural arsenic content in virgin soils ranging from 0.1 to 40 ppm. All the soil samples collected and analyzed within the study area fell within the normal range.

Barium

The common range for barium is 100 to 3000 ppm with a mean of 430 ppm in soils. All soil samples from this area were within this range and well below the normal mean. The interference in some of the samples was due to elements present in the soil with a higher ionization than barium, like sodium or potassium, which make it impossible to get a reading.

Cadmium

The common range for cadmium in soils is 0.01 to 0.70 ppm. However, the IEPA laboratory does not have the capability to detect cadmium at these very low levels. A visual and statistical comparison of the results shows one sample significantly higher, the 13.2 ppm from 0-6" depth at Grid No. 15, Wolf Lake Conservation Area.

Chromium

The common range for chromium in soils is from 1 to 1000 ppm with an average of 100 ppm. All but one sample fell into this range. This was at Grid No. 14 (Republic Steel) with 2,500 ppm and is probably due to the fact that the sample consisted of slag material and not virgin soil.

Copper

The normal concentration of copper in soils ranges from 2 to 100 ppm, the average being 30 ppm. All the soil samples analyzed for copper fell within the normal range.

Iron

The range of iron in soils is 7,000 to 550,000 ppm with an average of 38,000 ppm. All samples taken in this area fell within this range.

Lead

Lead levels in soils can vary greatly. From a USEPA study of surface soils in seventeen U.S. sites, an average lead concentration of less than 500 ppm was found. The mean lead concentration ranged from 99 to 1088 ppm. All the soil samples taken in this study fell within the above range.

Manganese

The U.S. Geological Survey began a study in 1961 of surface materials in the United States and found the manganese content to range from less than 1 to 7,000 ppm with a mean of 560 ppm. Cannon and Anderson collected 39 soil samples from remote areas of the United States to obtain background data on manganese content and found a soil mean of 660 ppm and a median of 500 ppm.

Soil samples in this area taken from 0 to 6 inches and 6 inches to 2 feet averaged above the normal mean of manganese concentrations. Many of the highs correspond to areas where slag was deposited. Since large quantities of manganese are used in the steelmaking process, contamination of the soils from dust and fumes in this area would be probable. The 6 inches to 2 foot depth sample at Grid No. 110 (Addams Elementary School) with concentrations of 9,250 ppm is 2,500 ppm above the highest surface concentrations found by the U.S. Geological Survey. There are few reports regarding man-made manganese contamination of soils.

Mercury

The range of mercury in soils is 0.01 to 0.3 ppm with an average of 0.03 ppm. All samples taken in this area fell within this range.

Nickel

Soils normally contain nickel at concentrations of 5 to 500 ppm with an average of 40 ppm. All soil samples taken fell within this range.

Selenium

The common range for selenium in soils is 0.1 to 2.0 ppm with a mean of 0.3 ppm. Four samples were above the normal range: 2' to 10' at Grid No. 3, 6" to 2' at Grid No. 8, 6" to 2' at Grid No. 10, and 0 to 6" at Grid No. 14.

Silver

The common range for silver in soils is 0.01 to 5.0 ppm. All soil samples from this area were in this range.

Zinc

Normal soils contain 10 to 300 ppm zinc. A study of industrial areas versus agricultural and residential areas showed an average of 56.6 ppm for industrial areas and 22.1 ppm for the other areas. Soil samples from this study for the 0 to 6" depth and the 6" to 2' depth were above the mean. The levels at Grid Nos. 14 and 15 are high because the borings were in areas where slag had been deposited. The 340 ppm from 2' to 10' at Grid No. 3 and 390 ppm at 0 to 6" depth at Grid No. 4 is over the normal range for zinc in soils.

4.4.3 Chemical Analysis of Metals in Water Samples

Analysis of groundwater samples showed that arsenic, barium, cadmium, chromium (total), copper, lead, nickel, selenium, and zinc concentrations fell below the General Use Water Quality Standards (35 Ill. Adm. Code 302.208). Only three of the metals analyzed (iron, manganese, and silver) were above these standards. Though several volumes of water were removed from the well casing prior to sampling, sufficient flushing to adequately remove sediments from the water was impossible. This, plus the industry waste in the area and the man-made fill deposits, especially the slag from the steel manufacturing, contributed to the above standard levels.

Levels of iron found in the groundwater over the 1.0 ppm standard ranged from 2.3 to 9.2 ppm. These above-standard concentrations were located in grids near the steel plants. Natural groundwater commonly has iron concentrations ranging from 0.5 to 10 ppm and the main purpose of setting the standard at 1.0 ppm was for aesthetic reasons. Acute iron toxicity from the groundwater in this area is highly unlikely, particularly since large quantities of iron must be ingested to produce intoxication. As an example, the average adult male would have to swallow 14 grams of elemental iron for a lethal dose.

Manganese was found at levels only slightly above the standard of 1.0 ppm at Grids No. 2 and 14 with concentrations of 1.18 and 1.21 ppm, respectively. Large quantities of manganese are used by the iron and steel industries. This, plus the fact that the soil samples taken in this area also contained high concentrations, would explain the slightly elevated levels in the groundwater.

Of the trace elements, manganese is the least toxic and, in fact, is an essential element in our diet. Studies conducted on the toleration of high amounts of dietary manganese on rats showed unaffected growth rates at concentrations as high as 2,000 ppm. The toxicity of manganese to man appears to be mainly through the inhalation of dust and fumes. The levels found in the groundwater samples in this area appear not to be a problem.

Two locations contained amounts of silver over the General Use Water Quality Standard (Table 4.3). Grids No. 2 and 16 both indicated 0.01 ppm. According to the USEPA Ambient Water Quality Criteria, natural water contains an average of 0.2 ppm. European scientists have found silver ions at concentrations of 100 to 200 ppm to be safe, stable, and long-lasting. These ions have been used in the purification of polluted water for drinking in space ships and orbiting stations. Based on the above data, these above standard silver concentrations could not be considered significant or a potential hazard. The results are shown in Table 4.4.

Table 4.3

General Use Water Quality Standards

Parameters	Concentration (in ppm)
Arsenic (total)	1.0
Barium (total)	5.0
Cadmium (total)	0.05
Chromium (total)	1.00
Copper (total)	0.02
Iron (total)	1.0
Lead (total)	0.1
Manganese (total)	1.0
Nickel (total)	1.0
Selenium (total)	1.0
Silver (total)	0.005
Zinc	1.0

Table 4.4

Chemical Analysis of Metals in Groundwater Samples
(results in ppm)

Parameters	Grid No.						
	2	3	4	5	8	9	10
Arsenic	0.006	0.005	0.003	0.003	0.002	0.001	0.011
Barium	Interference	Interference	0.200	0.000	0.000	0.000	Interference
Cadmium	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Chromium (total)	0.010	0.000	0.000	0.000	0.000	0.000	0.000
Copper	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Iron	0.200	0.100	7.300	5.400	4.800	0.300	9.200
Lead	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Manganese	1.180	0.310	0.220	0.560	0.330	0.340	0.350
Nickel	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Selenium	<0.001	0.001	0.001	<0.001	<0.001	0.001	<0.001
Silver	0.010	0.000	0.000	0.000	0.000	0.000	0.000
Zinc	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Parameters	Grid No.						
	12	14	16	17	18	19	20
Arsenic	0.044	0.000	0.009	0.003	0.015	0.002	0.001
Barium	Interference	0.000	Interference	0.000	0.200	Interference	0.300
Cadmium	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Chromium (total)	0.000	0.000	0.010	0.000	0.000	0.000	0.000
Copper	0.000	0.000	0.010	0.000	0.000	0.000	0.000
Iron	0.100	8.000	0.200	0.000	3.700	2.300	9.200
Lead	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Manganese	0.000	1.210	0.360	0.030	0.260	1.000	0.300
Nickel	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Selenium	0.003	0.001	<0.007	<0.001	0.001	<0.001	<0.001
Silver	0.000	0.000	0.010	0.000	0.000	0.000	0.000
Zinc	0.000	0.000	0.100	0.000	0.000	0.000	0.000

Table 4.4 (con't)

Chemical Analysis of Metals in Groundwater Samples

Parameters	Grid No. 22	24	25
Arsenic	0.007	0.003	<0.001
Barium	0.000	0.000	0.000
Cadmium	0.010	0.000	0.000
Chromium (total)	0.000	0.000	0.000
Copper	0.000	0.000	0.000
Iron	0.100	0.000	0.100
Lead	<0.050	<0.050	<0.030
Manganese	0.220	0.320	0.180
Nickel	0.000	0.000	0.000
Selenium	<0.001	0.001	0.003
Silver	0.000	0.000	0.000
Zinc	0.000	0.000	0.000

4.4.4 Chemical Analysis of Organics in Soil Samples

The portable organic vapor analyzer (OVA) was used at the drill site not only for the safety of the crew but also as a means of indicating if the soils were contaminated with organics. Where there was any detection on the OVA, sediment samples were taken. The laboratory results indicated that no significant amounts of organics were in the samples tested (Appendix B).

4.4.5 Chemical Analysis for Organics in Groundwater Samples

Groundwater samples taken at Grid No. 12 contained a number of solvents that can be toxic if ingested. These include benzene, toluene, xylenes, ethylbenzene and pyridine. The remaining organic compounds found at Grid No. 12 are indicative of the deposit found at this boring (i.e., slag), and may be toxic if ingested. Though these concentrations are low, no one should be allowed to drink the groundwater in the vicinity of Grid No. 12 (Chicago Port District).

Grid No. 14 indicated 20 ppb of pyridine which can be toxic by ingestion, and 15 ppb of methylpyridine which can be moderately toxic. These concentrations are also quite low.

It would appear at this time that these contaminants are a result of the industry in this area, since Grids No. 12 and 14 are located near industrial areas. Also, both boring logs indicated large slag deposits at each of these grids.

Dibutylphthalate, found at several grids in this area, is a contaminant which is often found in chemical analyses. Its presence could be due to a number of reasons, including the lubricants off the drill rig to the plastic bottles used in taking samples for metal analysis. All concentrations found of this contaminant were at low levels.

All other grids, except where dibutylphthalate was detected, indicated no detection of organic compounds. Results are shown on the laboratory data sheets found in Appendix B.

4.4.6 Results and Recommendations Related to the Chemical Analysis of Soils and Groundwater

4.4.6.1 Results

1. Metals analyses of soil samples in this area indicated values above the normal range and means for the following: chromium, cadmium, manganese, selenium, and zinc.

2. There was no significant amount of organic compounds in any of the soil samples tested.

3. Iron, manganese, and silver levels were slightly above the General Use Water Quality Standards. However, the concentrations found indicated no potential hazard.

4. Low concentrations of several organic compounds were detected in groundwater samples taken in Grids No. 12 and 14. These appear to be the result of industrial activity in this area.

4.5 Land Pollution Control Supplemental Sampling Program

Test results from the 1983 sampling study indicated five potential problem sampling sites. These five sites had one or more metal contaminants which were found at concentrations above the common ranges and means for certain metals in the soil. The metal contaminants were chromium, cadmium, selenium, manganese, and zinc. As part of the IEPA's continued commitment to the southeast Chicago area, a supplemental soil sampling program was conducted by the Division of Land Pollution Control (DLPC) in the fall of 1984. The five sites resampled in this sampling program were: Luella Playground/School (Grid #3), Bright School (Grid #8), Addams Elementary School Playground (Grid #10), Republic Steel (Grid #14), and Wolf Lake Conservation Area (Grid #15). The sampling grid established for the general study area also applied to this supplemental study.

Manganese and zinc contents in the soil were not retested in the supplemental study conducted by the DLPC because they are generally non-toxic by injection and pose more of a threat to human health when they occur as airborne particles or dust.

Soil samples were collected for the metal acid digest test to determine total heavy metal content of the soil and to serve as a comparison with results from the preliminary sampling study. To determine the amount of soluble metals present, which indicates toxicity of the soil, the EP Toxicity test was conducted on samples.

4.5.1 Drilling and Sampling Methodology

Soil samples were obtained using a stainless steel hand-operated bucket auger. Sampling sites were located as close to the preliminary sites as possible. Samples were collected from depths which were determined by previous test results. Sample depths were 0" to 6" at Grids No. 14 and 15, and 6" to 2' at Grids No. 3, 8 and 10. Because of the difficulty in penetrating the soil units with hand-operated equipment, sample location and depth at Grid No. 3 had to be adjusted. The supplemental sample was located approximately 50' from the original site and was sampled at a depth of 6" to 2'.

The hand auger and sampling tools were rinsed with deionized water between samples. Soil samples were placed in airtight glass jars, sealed with evidence tape and transported to the IEPA Chicago laboratory.

4.5.2 Chemical Analys Metals in Soils

4.5.2.1 Introduction

Soil samples were taken for both the metal acid digest and the EP Toxicity tests. The metal acid digest determines the total metal concentration in the soil, but does not indicate the amount of those metals which are soluble. The soluble metal content determines the toxicity of the soil and is found by the EP Toxicity test.

The results of the chemical analyses of metals in the soil and drilling logs for the supplementary sampling study are presented in Appendix C.

Table 4.5 summarizes preliminary and supplementary chemical analyses of metals in the soil at five supplementary sampling locations.

A discussion of the results of the chemical analyses is presented below by grid location:

Grid No. 3 (Luella Playground)

A soil sample at Grid No. 3 was collected to test for selenium. Both the preliminary (5.2 ppm) and supplementary (4.3 ppm) metal acid digest results are slightly above the common range and mean for total selenium in the soil (Lindsay, 1979). However, the EP Toxicity value of 0.028 ppm is well below the accepted maximum concentration of 1 ppm (Title 40, CFR Part 261.24 -- Maximum Concentrations of Contaminants for Characteristics of EP Toxicity). The low concentration of soluble selenium indicates non-toxic soil conditions at this sampling location.

Grid No. 8 (Bright School)

Selenium was sampled for at Grid No. 8. The metal acid digest result (5.8 ppm) is slightly above the common range and mean for total selenium in the soil. This data is similar to the preliminary study result of 4.0 ppm. Although the values for total selenium are above the common range, the EP Toxicity result of 0.039 ppm is well below the accepted maximum concentration of 1 ppm. This low concentration indicates non-toxic soil conditions.

Grid No. 10 (Addams Elementary School)

At Grid No. 10, a sample was collected to test for selenium concentrations. The metal acid digest result of 1.8 ppm fell in the upper end of the common range for total selenium in the soil. This value was similar to the preliminary result of 2.3 ppm which is slightly above the common range. At this location, non-toxic soil conditions exist because of the low concentration of soluble selenium as indicated by the EP Toxicity result of 0.054 ppm. This concentration is well below the accepted maximum concentration of 1.0 ppm.

Grid No. 14 (Republic Steel)

At Grid No. 14, a sample was collected from the slag material that covers this site. This material was tested for selenium and chromium concentrations. The metal acid digest result for selenium (1.8 ppm) falls in the upper end of the common range. The preliminary result of 2.1 ppm is slightly above the common range for total selenium in the soil. For total chromium in the soil both the preliminary (2500 ppm) and the supplementary (1921 ppm) metal acid digest results, are above the common range. Although the total metal concentrations are above their common ranges, the EP Toxicity results for both selenium (0.054 ppm) and chromium (0.01 ppm) fell well below the accepted maximum concentrations (selenium - 1.0 ppm; chromium - 5.0 ppm) for these metals. These low concentrations indicate non-toxic soil conditions at this sampling site.

Grid No. 15 (Wolf Lake Conservation Area)

To determine cadmium concentrations, a sample was collected at Grid No. 15. Results of the metal acid digest indicated that the total cadmium content of the soil was in such low concentrations that it fell below the detectable level (E 2.5 ppm) of the IEPA laboratory. The preliminary metal acid digest result (13.2 ppm) was above the common range and mean for cadmium in the soil. This difference in results could be due to local variability in the metal concentrations at this site.

The EP Toxicity result (0.01) is well below the accepted maximum concentration (1.0 ppm) of soluble cadmium in the soil, indicating non-toxic soil conditions at this sampling site.

4.5.3 Summary of Land Pollution Impacts -- Supplemental Study

1. The Division of Land Pollution Control collected samples at five locations. These sites were indicated as potentially hazardous due to their surface concentrations of specific heavy metals (selenium, chromium, cadmium).

2. In general, metal acid digest results (total metal content in soil) indicated concentrations of specific metals to be slightly above or in the upper end of their common ranges.

3. Some differences occurred between supplementary and preliminary study metal acid digest results. These differences were probably due to sampling location differences and variability in metal concentrations at these sites.

4. Although some of the metal acid digest results were above the common range for the metal, EP Toxicity results, which determine toxicity of the soil, were well below the accepted maximum concentrations for the metals.

Table 4.5

Summary of Preliminary and Supplementary Chemical Analyses of Metals in the Soil at Five Sampling Locations

CONTAMINANT	GRID LOCATION	TYPE TEST	SAMPLE DEPTH (ppm) 0"-6"	6"-2'	2'-10'
SELENIUM	3	MAD*	-	4.3	(5.2)
		EPT**	-	0.028	-
	8	MAD	-	5.8 (4.0)	-
*Common range =		EPT	-	0.039	-
(0.1-2.0 ppm)	00	MAD	-	1.8 (2.3)	-
Mean = 0.7 ppm		EPT	-	0.054	-
**Maximum concentration for EP	04	MAD	1.8 (2.0)	-	-
Toxicity = 1.0 ppm		EPT	0.054	-	-
CHROMIUM	14	MAD	1921 (2500)	-	-
Common range = (1-1,000 ppm)		EPT	0.01 ppm	-	-
Mean = 100 ppm Maximum concentration for EP Toxicity = 5.0 ppm					
CADMIUM	15	MAD	2.5 (13.2)	-	-
Common range = (0.01-0.7 ppm)		EPT	0.01 ppm	-	-
Mean = 0.06 ppm Maximum concentration for EP Toxicity = 1.0 ppm					

Explanation

* MAD = Metal Acid Digest Test
** EPT = EP Toxicity Test
. ( ) = Numbers in parenthesis indicate preliminary sampling study test results for comparison

* Common ranges and means are for the total metal content in soil and are used in discussing metal acid digest results (Lindsay, 1979)
** Accepted maximum concentrations of contaminants for characteristics of EP Toxicity

5.0 Water Pollution Assessment

The Illinois Environmental Protection Act of 1970 and the Federal Clean Water Act of 1972 provide the regulatory framework for management of water quality in Illinois. Under this far reaching legislation, mechanisms are in place to establish water quality uses, water quality standards, point source controls, compliance monitoring and enforcement through the Illinois Pollution Control Board and courts when needed.

All point source discharges are required to have an NPDES (National Pollutant Discharge Elimination System) permit which sets forth specific numerical values of chemical constituents which are not to be exceeded. Laboratory testing of the discharge is required and results are submitted to IEPA on a monthly basis. IEPA reviews the results and enforcement actions are taken when values exceed numerical criteria.

In addition to point source control activities, the IEPA has responsibility for the management of sludge from wastewater treatment works, dredge and fill activities in waters of the State, ambient water quality monitoring, and the analysis of water quality standards.

5.1 Water Resources and Surface Features

Water is a dominant feature of the Southeast Chicago study area. The primary resources include Lake Michigan, Lake Calumet and the Calumet River. In addition, the study area also has interior drainage channels which carry storm runoff and seepage waters. The key factors which influence the water uses and characteristics are as follows:

1. The waterway is used for deep draft navigation and is economically significant.

2. The natural drainage has been altered by river flow reversal and is regulated by the O'Brien Lock.

3. The quality and quantity of water in the system is generally a function of diversion from Lake Michigan. The overall water quality of the river is good.

4. Storm runoff can temporarily alter the water quality and reverse the flow of the river toward Lake Michigan.

5. The interior drainage and the river have been extensively modified.

6. The waterway requires maintenance dredging to meet navigation needs.

7. Lake Calumet is partly isolated from the main water flow of the system and tends to be more affected by local conditions, storm drainage and seepage water.

8. Subpart C, Section 303.441 of Title 35 designates the Calumet River and Lake Calumet as Secondary Contact Waters. The general use and public water supply standards do not apply to these waters.

9. The Metropolitan Sanitary District treats the industrial process waste at their facility which discharges outside of the study area. The majority of wastewater discharges to the river consist of cooling water or site runoff water.

5.2 Description of the Waterway

The Calumet River is within the corporate limits of the City of Chicago and the jurisdiction of the Metropolitan Sanitary District of Greater Chicago (MSDGC). Historically, the natural flow of the Calumet River was to Lake Michigan. This natural flow was reversed after the completion of the Calumet-Sag Channel in 1922. The flow is regulated by the operation of the O'Brien Lock. On occasion, the flow is toward Lake Michigan during periods of excessive storm runoff. The opening of controls to reverse flows is quite rare.

The Calumet River, Little Calumet River and Calumet-Sag Channel are major links in the inland waterway system that connect Lake Michigan with the Gulf of Mexico. Most of the project area is maintained for deep-draft (18-28 foot) vessels for waterborne commerce. Movements of general cargo, grain, bulk liquids and containerized cargo occur in the system. Certain shipping terminals handle foreign trade and Great Lakes movements. Lake Calumet is a natural lake which has been extensively altered and is under the jurisdiction of the Chicago Regional Port District. The south end of the lake has been partly developed as a harbor. The north half of the lake consists of diked areas which were reserved by the Port District as potential areas to place dredged material from future development. The lake has wetland areas and associated land forms which differ markedly from the river system. These areas, although disturbed by urbanization, do provide limited fish and wildlife habitat in the project area.

The quality of the fishery and associated biological communities vary within the study area. The quality of the Calumet River fishery appears to be very good and reflects the influence of the Lake Michigan fishery and dominance of the diversion water in the system. The fishery downstream of the O'Brien Lock is of lower quality. Yellow perch dominate the lakeward half of the Calumet River while bluntnose minnows are the dominant fish species in the lower half. The fishery of Lake Calumet has game species including largemouth bass, black crappie and yellow perch. The northern portion of Lake Calumet generally has higher quality fish communities than the more developed areas around the harbor complex. The lake apparently provides for a limited bass population in the river around the inlet. Localized conditions can provide for recreational fishing opportunities. Lake Calumet receives drainage from adjacent areas and is affected during periods of intense runoff.

5.3 Ambient Water Quality

Since 1958, the IEPA and its predecessor, the Bureau of Water Pollution Control of the Department of Public Health, have conducted a program of ambient stream monitoring. The purpose of this ambient monitoring is to: (1) characterize and define trends in the physical, chemical, and biological condition of the State's surface waters; (2) establish baselines of water quality; (3) identify and quantify new or existing water quality problems or problem areas; and (4) act as a triggering mechanism for intensive surveys or other appropriate actions.

The IEPA's historic (pre-1977) ambient network for the Calumet study area is identified in Figure 5.1. Between July of 1977 and December of 1978, the statewide network was substantially revised (i.e., the network was reduced from 600 to 200 stream stations). The two Calumet network stations (HAA-01 and HAA-02) in the study area were eliminated in the network redesign. The reduction of IEPA sampling sites in the Chicago area recognized that the extensive monitoring activities conducted by the Metropolitan Sanitary District of Greater Chicago (MSDGC) should supplement the IEPA's monitoring. The network redesign eliminated redundant sampling stations and the potential for duplication of monitoring effort. The MSDGC sampling stations for the study area are identified in Figure 5.2.

Agency ambient network data for the period 1967 through 1977 is summarized in Appendix D. The violations by parameter for this 10-year period are identified below:

HAA-01 (Calumet River - South of Lake Calumet)

One ammonia violation in 1974.

Five fecal violations (one each during 1974, 73, 71, 70 and 69).

Two lead violations (one each in 1974 and 1970).

One zinc violation in 1974.

One D.O. violation in 1974.

HAA-02 (Calumet River - near Lake Michigan)

One ammonia violation in 1971.

Three fecal violations (two in 1971 and one in 1968).

Three lead violations (two in 1974 and one in 1970).

Three cyanide violations (two in 1971 and one in 1970).

One HexChromium violation in 1970.

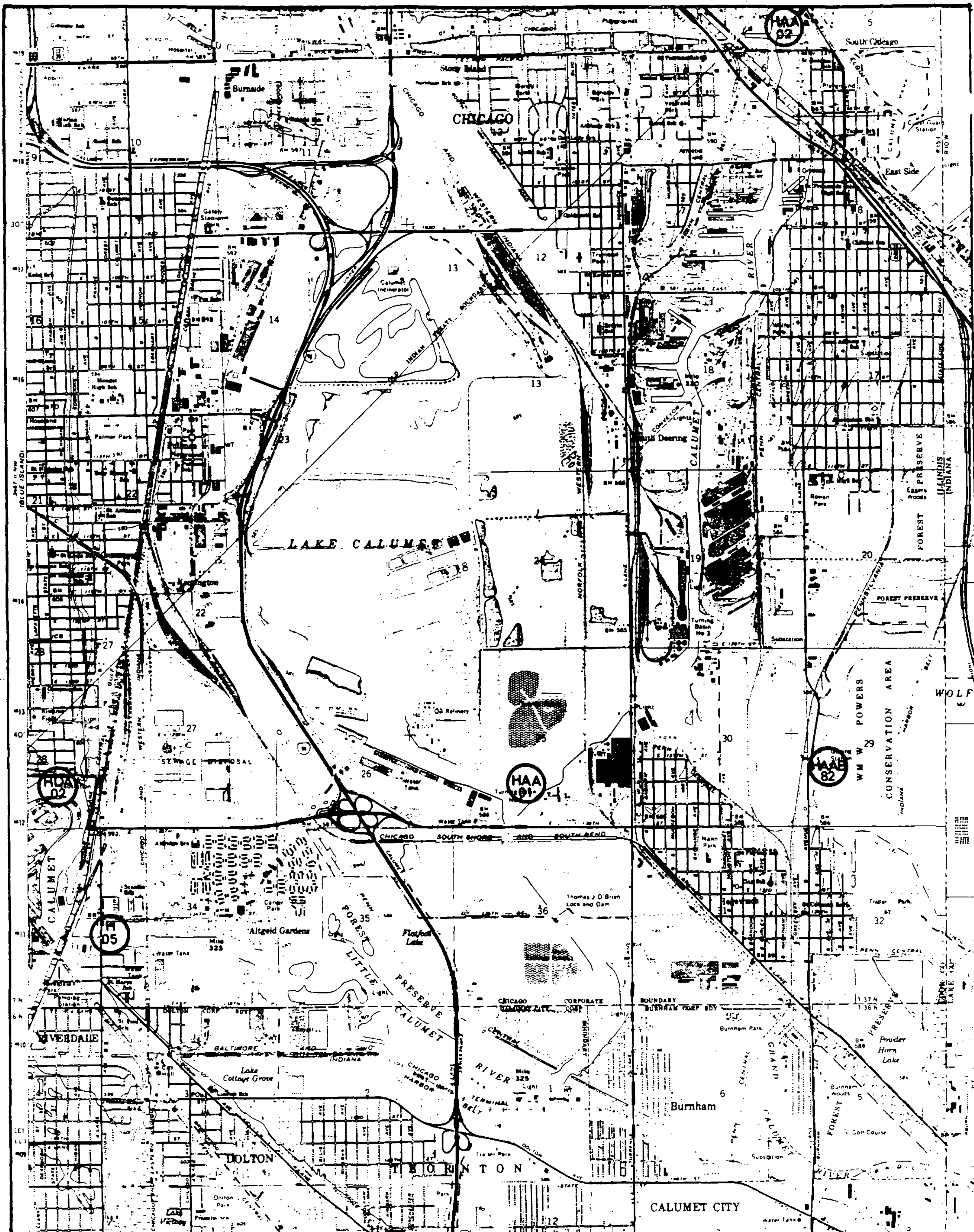


FIGURE 5.1

IEPA Historic (Pre 1977) Ambient Water Quality Monitoring Network

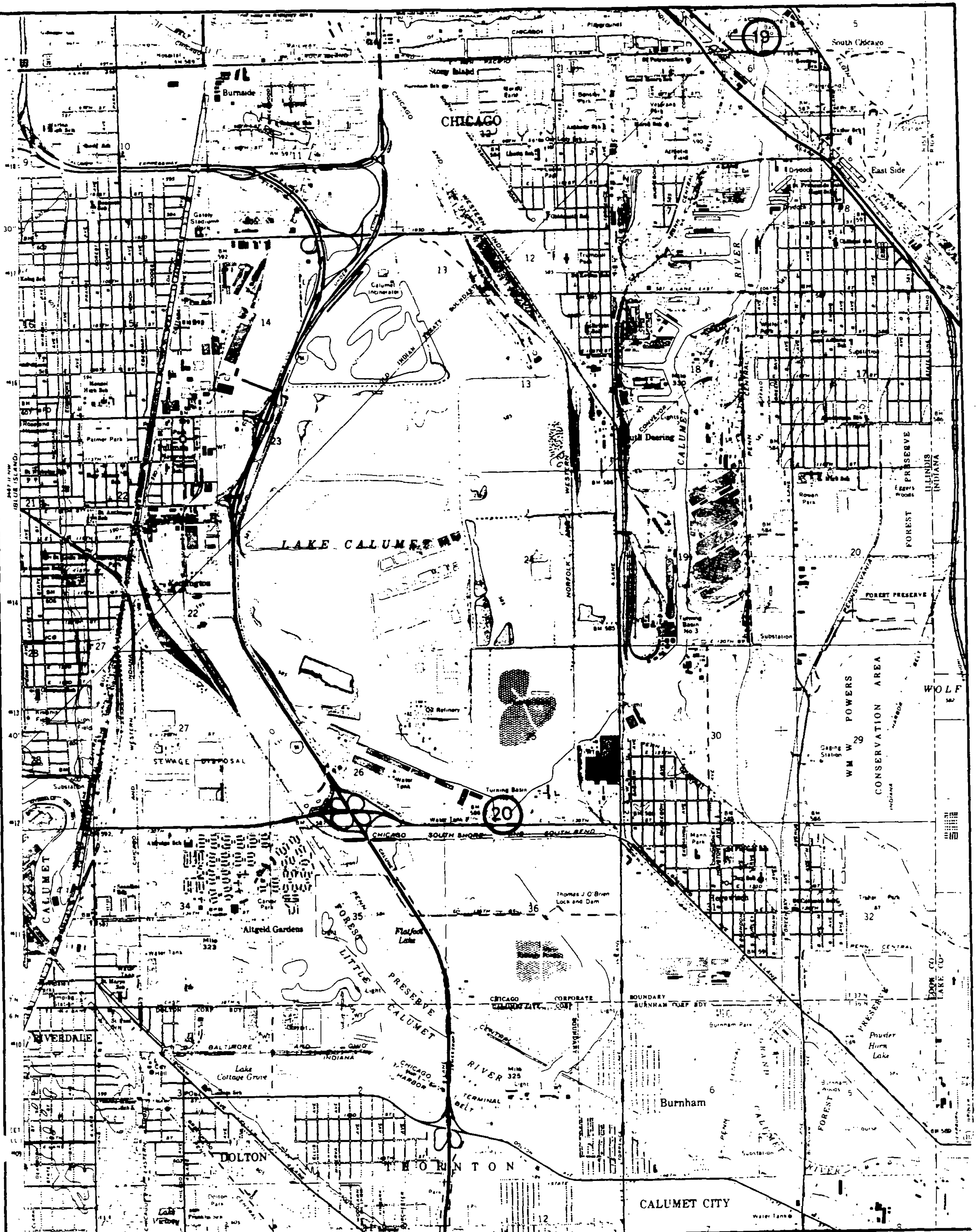


FIGURE 5.2 The Metropolitan Sanitary District of Greater Chicago Ambient Water Quality Monitoring Network

A review of chemical water quality monitoring data from MSDGC for the period of 1970 through 1981 concludes the following:

1. "Concentrations of cyanide in the waters of the Grand Calumet River downstream of U.S. Steel Gary Works, IHC, Indiana Harbor, Lake Michigan and Calumet River have shown significant decreases over the period 1970 through 1981" (Figure 5.3).

2. "Concentrations of total suspended solids in the Grand Calumet River downstream of U.S. Steel Gary Works, IHC, Indiana Harbor, Lake Michigan and Calumet River have shown decreases over the period 1970 through 1981" (Figure 5.4).

In summary, the overall water quality of the Calumet River from Lake Calumet to Lake Michigan has been and continues to be generally good.

The physical and chemical properties of surface waters play an important role in determining its suitability for maintaining biological life. The waterway is greatly influenced by the high quality diversion waters from Lake Michigan. The quality is affected by local runoff during storm events, seepage return water, sediment reentrainment, incidental spills, and waste discharges.

Wastewater discharges entering the Calumet River are located in Figure 5.5. The general description of treatment processes, National Pollutant Discharge Elimination System (NPDES) permit information, and compliance data are contained in Appendix E. In general, most discharges release cooling water or noncontaminated stormwater runoff. These discharges have been previously found to be in substantial compliance with the National Pollution Discharge Elimination System.

Most of the industrial process waste is tributary to the MSDGC system and is treated and discharged outside of the study area. However, pollution can occur during storm periods if the sewer system becomes overloaded and can result in a combined sewer overflow to the river.

5.4 Area Issues and Problems

Various water pollution control problems have occurred which are routinely handled by ongoing programs or special efforts. Periodic navigation hazards, such as spills, are handled by the IEPA's Emergency Response Unit and usually include coordination with other agencies, such as the U.S. Coast Guard, Corps of Engineers, MSD, the Department of Conservation, and the Illinois Division of Water Resources. Since MSD has assumed the primary responsibility for monitoring of waterways within its jurisdiction, they are often involved with these efforts.

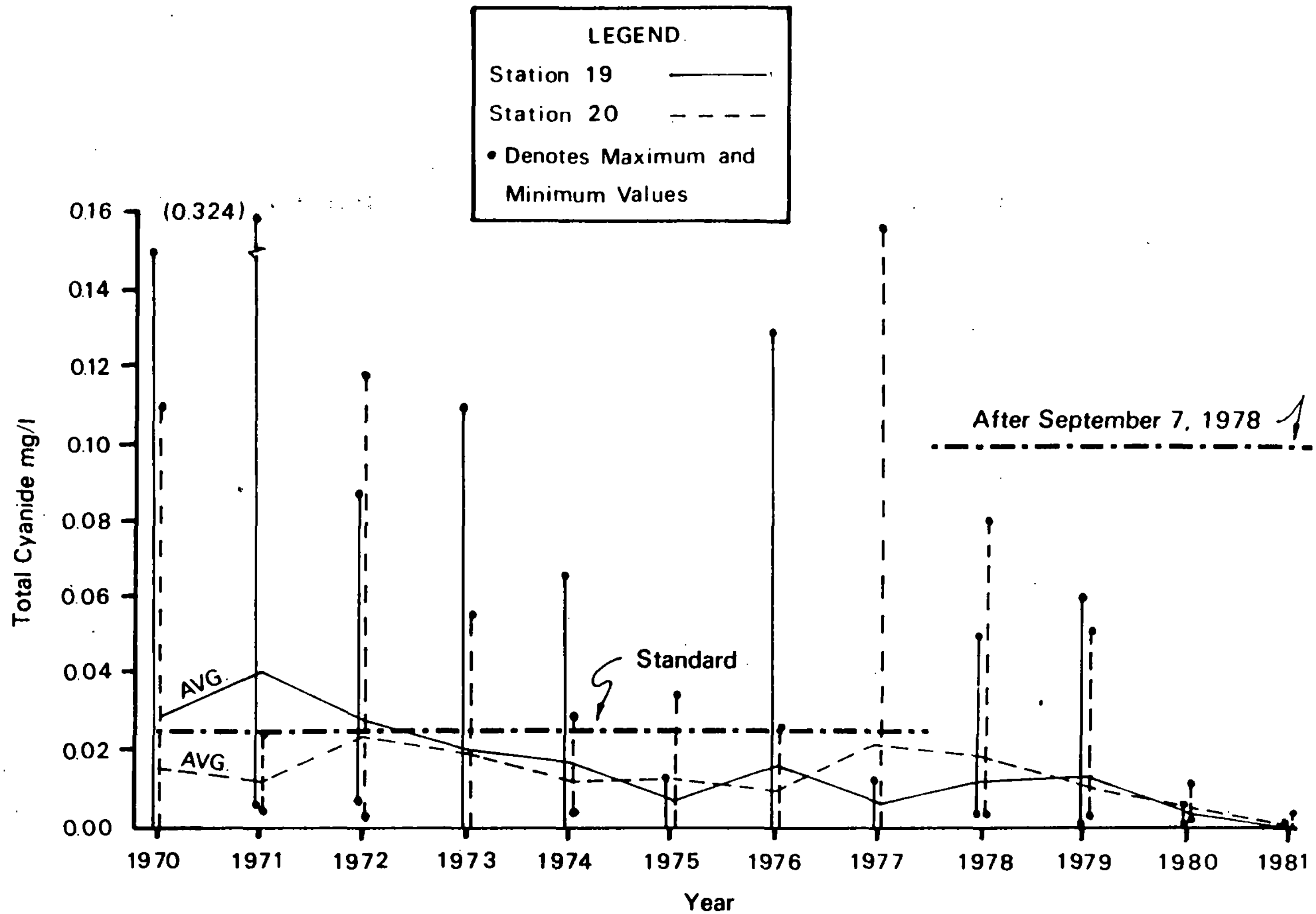


FIGURE 5.3

Total Cyanide Concentrations in the Calumet River in Illinois for 1970 through 1981

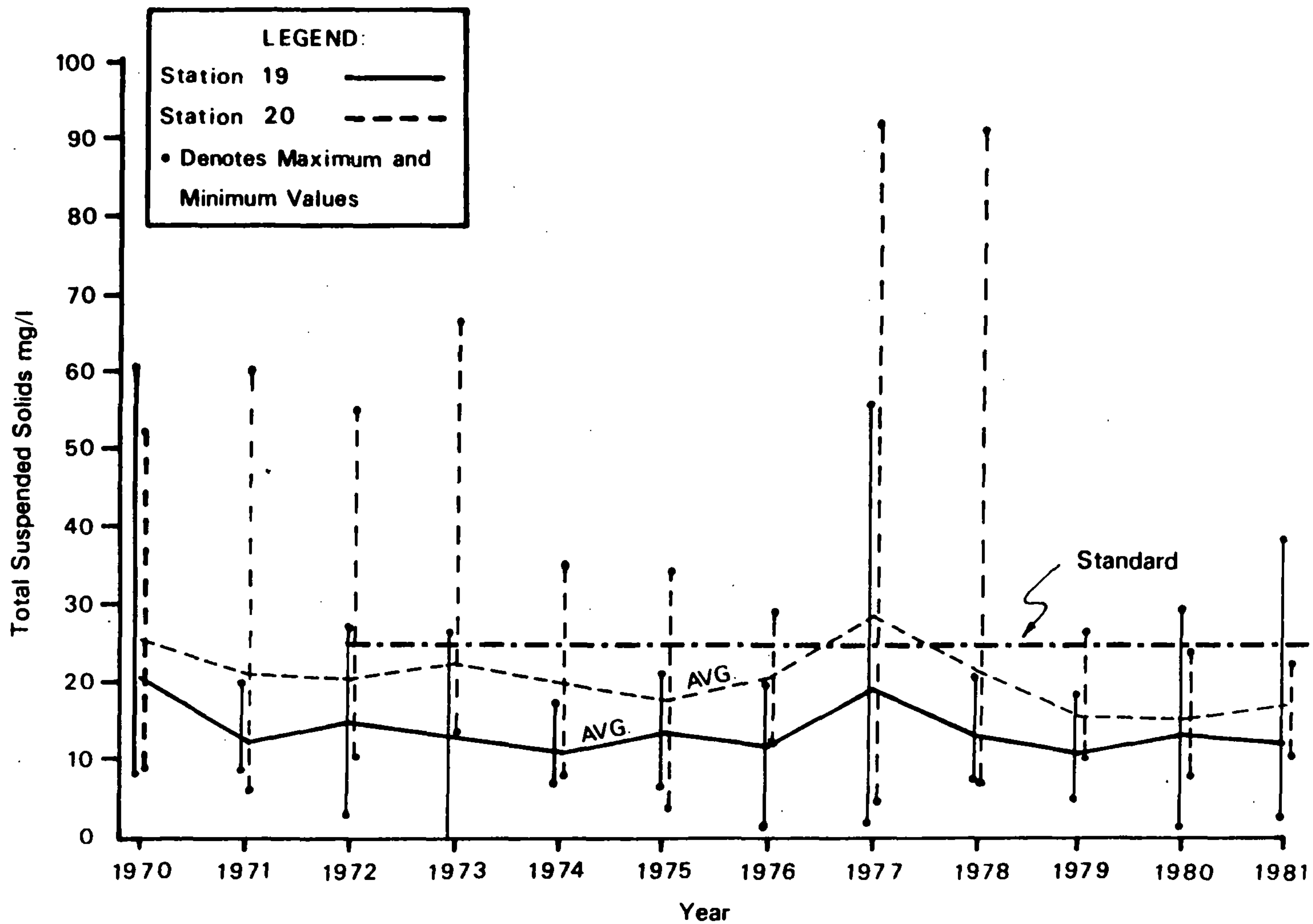


FIGURE 5.4

Total Suspended Solids Concentrations in the Calumet River in Illinois for 1970 through 1981

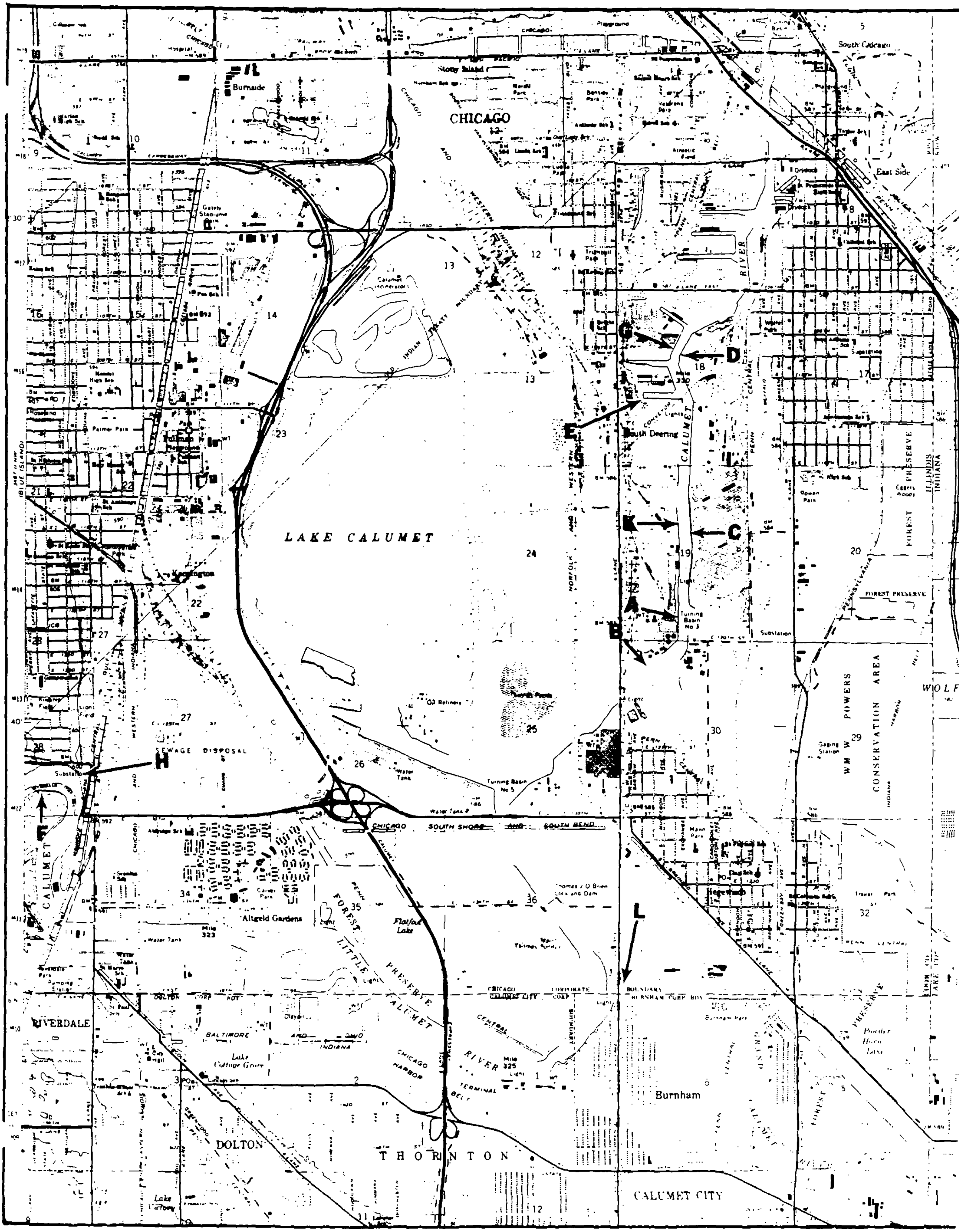


FIGURE 5.5 Wastewater Discharges Entering the Calumet River

An Interagency Task Force composed of the Illinois Division of Water Resources, the IEPA and the Metropolitan Sanitary District is currently responding to issues raised by the Chicago Regional Port District. As a result of a meeting held in November of 1982, a reconnaissance study is underway to monitor and evaluate tributary inflow impacts on Lake Calumet. The MSD has undertaken a sampling program which responds to potential runoff problems from the Venetian Canal. Analyses of information and data, once collected, will determine if a problem exists and the extent of the problem. Preliminary findings indicate that the canal discharge, which includes operation of a pump station near the expressway, contains a large solids content during storms. The Department of Transportation has already taken certain remedial steps in the right-of-way of the expressway and pumping station.

The Corps of Engineers has filed a final Environmental Impact Statement for "Chicago Area Confined Disposal Facility and Maintenance Dredging" in Cook County, Illinois. The project is designed to handle disposal of material from the Calumet River and harbor to maintain federal deep-draft navigation channels. A waiver of the 25 percent non-federal contribution of the Port District required a certified Water Quality Management Plan and compliance of dischargers in the area. The IEPA certified the Lake Michigan South plan, which was approved by USEPA on September 16, 1981. Based upon this plan and the determination that compliance of facility dischargers is processed according to the plan, the USEPA provided a waiver requested under Section 123(d) of the Rivers and Harbors Act of 1970. An IEPA permit to the Corps of Engineers has been issued for the facility construction and operation. The Confined Disposal Facility (CDF) is located at the mouth of the Calumet River, adjacent to Iroquois Landing Lakefront Terminal. The two year construction period is nearly completed, and the CDF is expected to begin receiving dredged material in the fall of 1985.

In January of 1984, the Chicago Regional Port District released the Comprehensive Plan 1984, a new ten year master plan for the development of Lake Calumet. The plan proposes redesigning Lake Calumet to provide more landfill area for non-shipping uses such as industrial, commercial, and service establishments, a marina, and a recreational lake and park. A copy of the Comprehensive Plan 1984 is included in Appendix J.

The Port District's enabling act requires that all changes and modifications to existing harbor plans and any comprehensive plan for the Port District shall be submitted to the Illinois Department of Transportation for approval.

5.5 Water Pollution Additional Studies

5.5.1 Lake Calumet Fish Flesh Sampling

As part of the IEPA commitment to this study, the Division of Water Pollution Control (DWPC) collected fish flesh samples in Lake Calumet. The sampling took place on October 6, 1983 and was jointly conducted by the IEPA and the Chicago Metropolitan Sanitary District. The laboratory analyses of the fish samples were conducted by the Illinois Department of Public Health.

The results of contaminant analyses for the fish are given in Table 5.1. As indicated in the table, all sample contaminant levels were below the Food and Drug Administration action levels. Action levels are limits on the amount of contaminants present in fish flesh. When action levels are exceeded, it is recommended that the fish not be consumed. Based upon the samples taken in Lake Calumet on October 6, 1983 and the information contained in Table 5.1, a problem does not appear to exist with fish in Lake Calumet.

Table 5.1

Fish Contaminant Analysis for Lake Calumet

Parameter	Action Level	LM Bass	Carp	W. Crappie
PCB (estimated as 1254)	5.0	0.219	0.631	0.263
Hexachlorobenzene	-	Tr	Tr	Tr
Hexachlorocyclohexanes (BHC)	-	Tr	Tr	Tr
Heptachlor epoxide	0.3	Tr	Tr	Tr
Chlordanes	0.3	Tr	0.014	Tr
DDT and analogs	5.0	0.018	0.069	0.022
Dieldrin	0.3	Tr	Tr	Tr
Endrin	-	Tr	-	-
trans-Nonachlor	-	Tr	Tr	Tr
Percent Fat	-	1.6	2.8	1.2

Tr = <0.01 ppm

Contaminant analysis of largemouth bass, carp, and white crappie fillets collected in 10/6/83 in Lake Calumet. Fish lengths/weights are provided below. Concentrations are given in mg/kg (parts per million).

	lengths	weights
L.M. Bass	(180/169/159/163/165 mm)	(75/62/44/59/69 g)
Carp	(520/578/493/516/511 mm)	(4.0/5.5/3.3/4.0/4.4 lbs)
W. Crappie	(209/187/199/163/181 mm)	(120/72/98/34/72 g)

6.0 Air Pollution Assessment

6.1 Introduction

6.1.1 Ambient Air Quality Standards

The 1970 Clean Air Act Amendments required the Administrator of the USEPA to promulgate National Ambient Air Quality Standards (NAAQS) for five pollutants: total suspended particulates (TSP), sulfur dioxide (SO_2), nitrogen oxides (NO_x), ozone (O_3), and carbon monoxide (CO). These standards were promulgated in early 1971. In addition, an NAAQS was established in 1978 for lead (Pb).

Consistent with the intent of the Illinois Environmental Protection Act and the Federal Clean Air Act, Illinois has adopted ambient air quality standards that specify maximum permissible short-term and long-term concentrations of various contaminants in the atmosphere. These standards are set for the purpose of protecting the public health and welfare.

Air contaminants increase the aggravation and the production of respiratory and cardiopulmonary diseases. Air quality standards which have been set to protect public health are called primary standards.

Public welfare includes, among other things, effects on crops, vegetation, wildlife, visibility and climate, as well as effects on materials, economic values and on personal comfort and well-being. Standards set to protect public welfare are called secondary standards.

The Illinois and National Ambient Air Quality Standards are presented in Table 6.1. These standards are legally enforceable limitations, and any person causing or contributing to their violation is subject to enforcement proceedings under the Environmental Protection Act. The standards have been used as a basis for the development of implementation plans by the State for the abatement and control of pollutant emissions from existing sources, and to ensure that population, industrial and economic growth trends do not add to the region's air pollution problems.

6.1.2 Non-Criteria Pollutants

Pollutants not regulated by NAAQS, or "non-criteria" pollutants, may be regulated through other mechanisms. USEPA uses Sections 111 (New Source Performance Standards, NSPS) and 112 (National Emission Standards for Hazardous Air Pollutants, NESHAPS) of the Clean Air Act to control several other pollutants on a source-by-source basis. In general, Section 112 (NESHAPS) is used to control highly toxic and widespread pollutants, while Section 111 (NSPS) is used to control pollutants of lesser toxicity. Regulations under both sections take the form of performance standards for control of specific pollutants from specific sources.

Table 6.1

Summary of National and Illinois[1]
Ambient Air Quality Standards

POLLUTANT	TIME OF AVERAGE	PRIMARY STANDARD (AT 25°C and 760 mm of HG)	SECONDARY STANDARD
Particulate Matter (TSP)	Annual Geometric Mean	75 ug/m^3	60 ug/m^3
	24-hour	260 ug/m^3	150 ug/m^3
Sulfur Dioxide (SO_2)	Annual Arithmetic Mean	0.03 ppm (80 ug/m^3)	None
	24-hour	0.14 ppm (365 ug/m^3)	None
	3-hour	None	0.5 ppm (1300 ug/m^3)
Carbon Monoxide (CO)	8-hour	9 ppm (10 mg/m^3)	Same as Primary
	1-hour	35 ppm (40 mg/m^3)	Same as Primary
Ozone (O_3)	1-hour/day	0.12 ppm (235 ug/m^3)	Same as Primary
Nitrogen Dioxide (NO_2)	Annual Arithmetic Mean	0.05 ppm (100 ug/m^3)	Same as Primary
Lead (Pb)	Quarterly Arithmetic Mean	1.5 ug/m^3	Same as Primary

[1] Illinois Air Quality Standards are identical to National Air Quality Standards.

NOTE: All standards with averaging time of 24 hours or less are not to be exceeded more than once per year.

The standard setting process begins with a screening and ranking of possible toxic pollutants. For the highest ranked pollutants, health assessments and population exposure assessments are performed to determine the potential magnitude of the public health hazard associated with a given pollutant. Based upon the results of these assessments, the decision is made regarding whether a pollutant should be regulated under Section 112, Section 111, or not regulated at all, depending upon the severity of the hazard posed.

Once it has been decided to regulate a pollutant under either Section 111 or 112, the source categories (types of industries) are ranked according to the efficiency and effectiveness of achieving hazard reductions by regulating that source. Performance standards are then developed and promulgated for the highest ranked source categories. The Illinois Environmental Protection Act provides for the adoption of these standards as law in Illinois.

To date, regulations are in effect under Section 112 for mercury, vinyl chloride, beryllium, and asbestos. Regulations have been proposed by USEPA for benzene, arsenic, and radionuclides. The pollutants regulated under Section 111 are sulfuric acid mist, hydrogen sulfide, reduced sulfur compounds, and fluorides. Also, regulations have been proposed by USEPA for certain solvents.

6.1.3 State Implementation Plan Process

Under the requirements of the federal Clean Air Act, each state is given the responsibility of developing and administering its own air pollution control program to attain and maintain the national ambient air quality standards for various pollutants. That program is known as the State Implementation Plan (SIP) for air pollution control. The Illinois SIP is a massive, technical blueprint for restoring and preserving a healthy air-pollution-free environment. It is more than a compendium of specifications that air quality must meet and more than a list of the minimum technical requirements that air pollution sources must adhere to: it defines the process by which air pollution goals will be achieved, explains why certain air pollution controls were selected over alternatives, and describes the relationships among the organizations involved in restoring and maintaining a healthy environment.

The SIP is a dynamic document that changes in response to changing Clean Air Act requirements and State environmental goals. The air pollution regulations limiting the quantities of pollutants emitted from various industrial processes are the heart of the SIP and are subject to a public hearing process before the Illinois Pollution Control Board. After this process is complete, the final rules are incorporated in a comprehensive SIP document for review and approval by the USEPA. Once approved by the USEPA, the rules formally become a part of the approved SIP and, as such, are federally enforceable.

6.2 Description and Characterization of Air Pollutant Emissions and Major Emission Sources in the Southeast Chicago Study Area

6.2.1 Point Source Emissions Inventory

To conduct air quality analyses, a vast amount of data is needed concerning air pollution sources and the pollutants they discharge. The term "emissions inventory" has become the umbrella term for the wide range of information needed for air pollution studies. The data that compose the core of any inventory are the listing of sources and the amounts of air pollutants they discharge into the atmosphere. Other data common to most inventories include type of fuel used, hours of operation, average and maximum throughput, and controlled and uncontrolled emission rates.

The emissions inventory used in this study, included in Appendix F, along with the map of air pollution emission sources (Figure 6.1), allow the reader to determine the type and density of air pollution sources in different sectors of the defined study area.

6.2.2 Major Point Sources

Facilities which emit over 100 tons per year of any single pollutant are generally termed major point sources. Such facilities are identified in Appendix F as those facilities which have a sequential number written in the left margin. The locations of these facilities with their identifying number have been plotted on a map of the study area in Figure 6.1. Twenty-two major facilities are identified.

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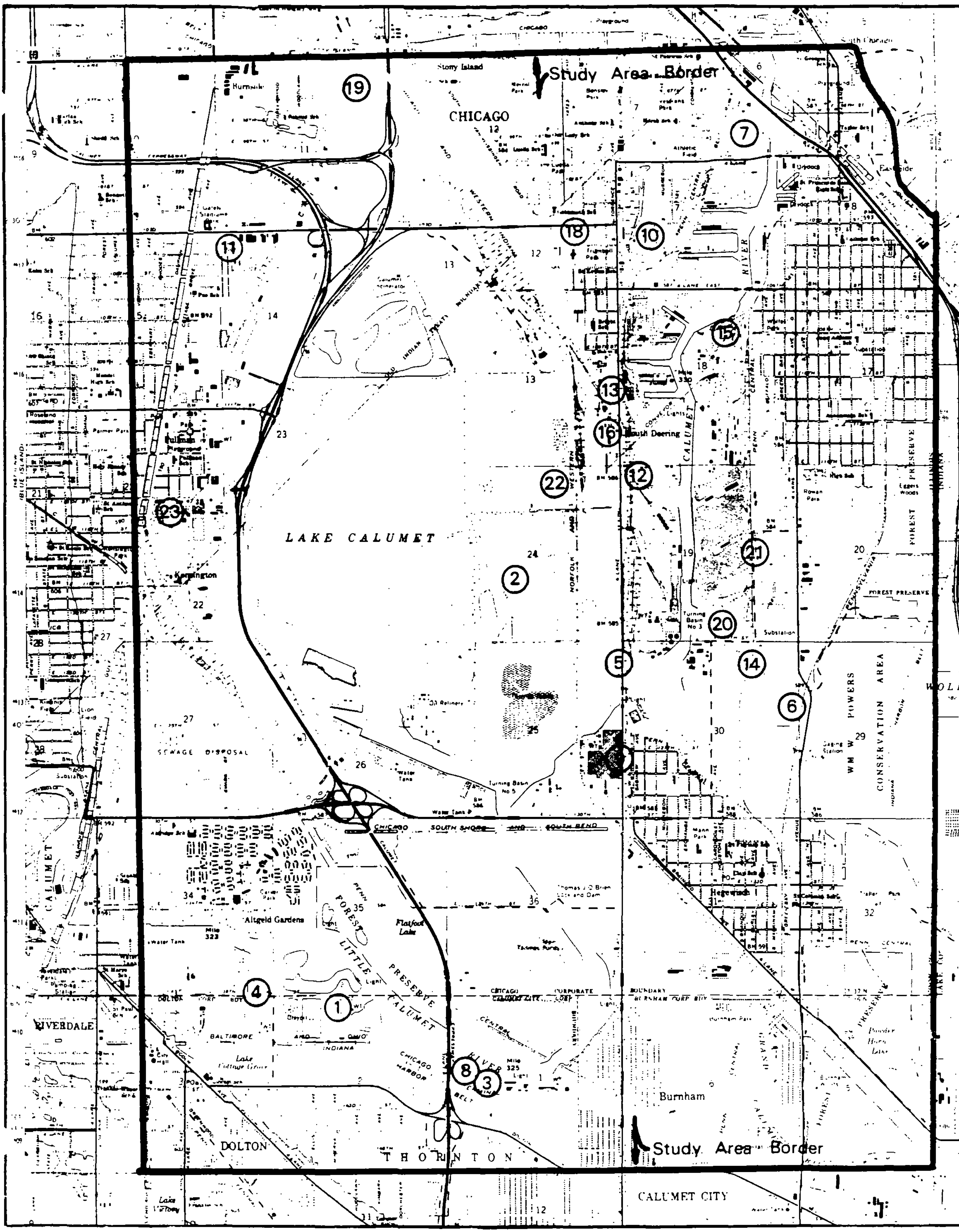


FIGURE 6.1 Major Air Pollution Emission Sources in the South Chicago Study Area

6.2.3 Area Sources

Normally, the term "area sources" is applied to sources of pollution which are spread over large expanses or are too small and numerous to treat individually. Agricultural areas which are sources of windblown dust or automobile traffic on city streets are examples of area sources. Residential heating units as a source of sulfur dioxide would represent a class of area sources which are both small and numerous. Odor emissions from landfill sites are another example of an area source. How area sources are dealt with really depends upon the pollutant being investigated and the scale of the study area.

Previously, emissions of O_3, TSP, SO_2 and NO_x have been studied by the IEPA in regional analyses of the Chicago area. Area sources of these pollutants were allocated throughout the Chicago region including the Lake Calumet area. The emissions inventories are available in IEPA reports. The usefulness of these inventories should be reevaluated if they are to be applied to a smaller scale study of the Lake Calumet area. Additionally, emissions of lead (both point and area sources) have been studied, specifically in the steel mill area. Figure 6.2 shows the roadways analyzed as area sources in the study area. Composite exhaust emissions for the steel mill study area are shown in Appendix H. These values were determined from the following data sources: traffic volumes obtained from the Chicago Area Transportation Study (CATS) and the Illinois Department of Transportation (IDOT); average vehicle speeds also obtained from CATS; traffic composition, that is, fractions of vehicle miles traveled (VMT) by vehicle type were specified for freeways and arterial streets based on data developed by CATS; and VMT growth factors which were determined by comparing 1978 volume to 1983 and 1985 estimates provided by CATS.

6.3 Description and Characterization of Ambient Air Pollution Levels

6.3.1 Air Quality Monitoring Network

Ambient air monitoring has been conducted in and around the study area since the early 1960's by both state and local air pollution control agencies. The available air quality data base is composed primarily of total suspended particulate (TSP) data and data resulting from the chemical analysis of TSP filter samples. The air quality data base is maintained both at the IEPA headquarters and at the USEPA's National Aerometric Data Bank (NADB).

The monitoring network operated in 1984 is depicted in Figure 6.3. TSP monitors were located at the Addams, Anthony, Carver and Washington sites. The Addams site also measured NO_2 levels. Ambient O_3concentrations were measured at the Roseland and Southeast (S.E.) Police Station sites with the S.E. Police Station site also measuring SO_2 levels. PM_{10} concentrations were measured at Washington High School in 1984. An additional PM_{10} and TSP monitor has been installed at Bright School and is collecting data in 1985.

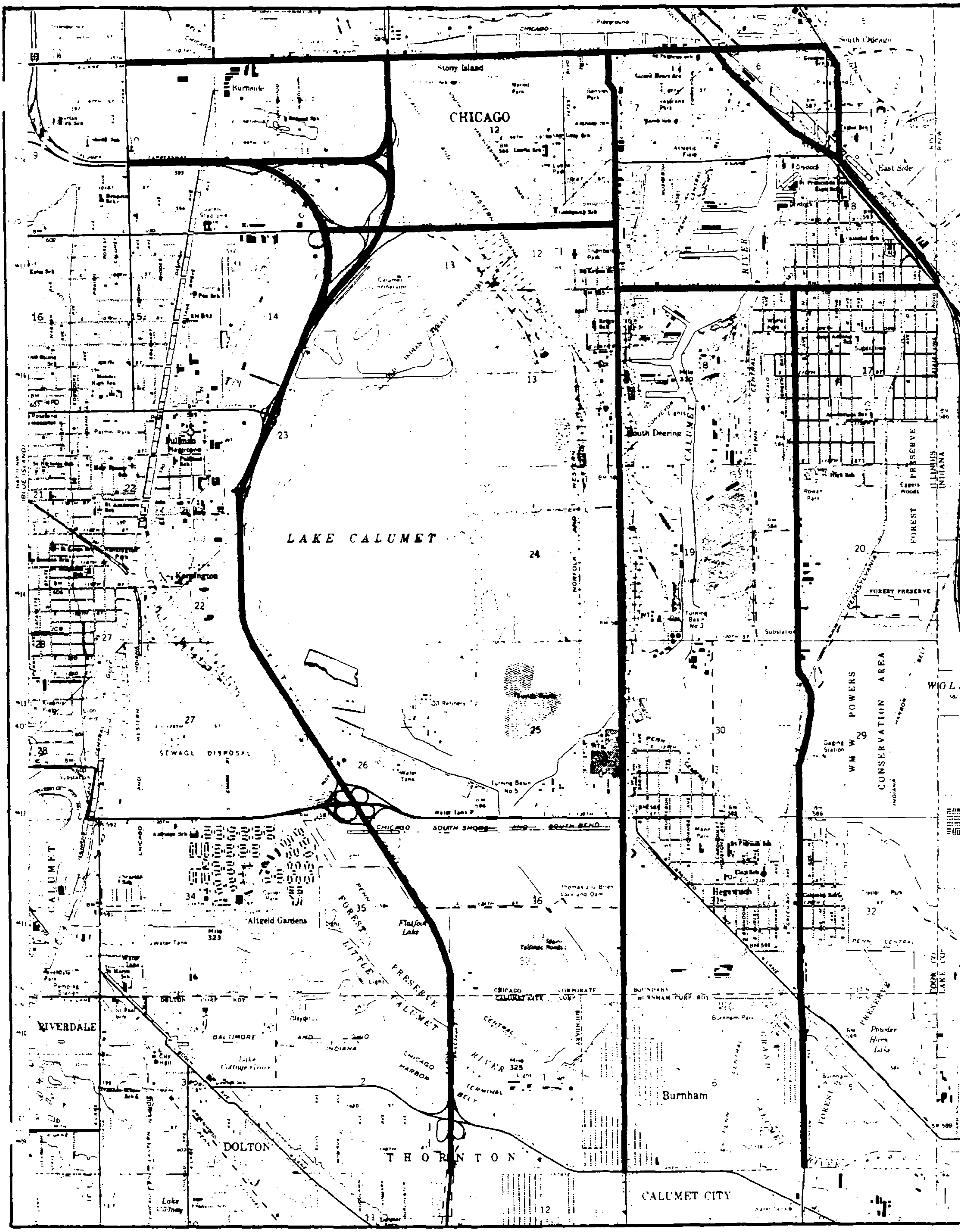


FIGURE 6.2 Roadways Analyzed as Area Sources in the Chicago Steel Mills Study Area

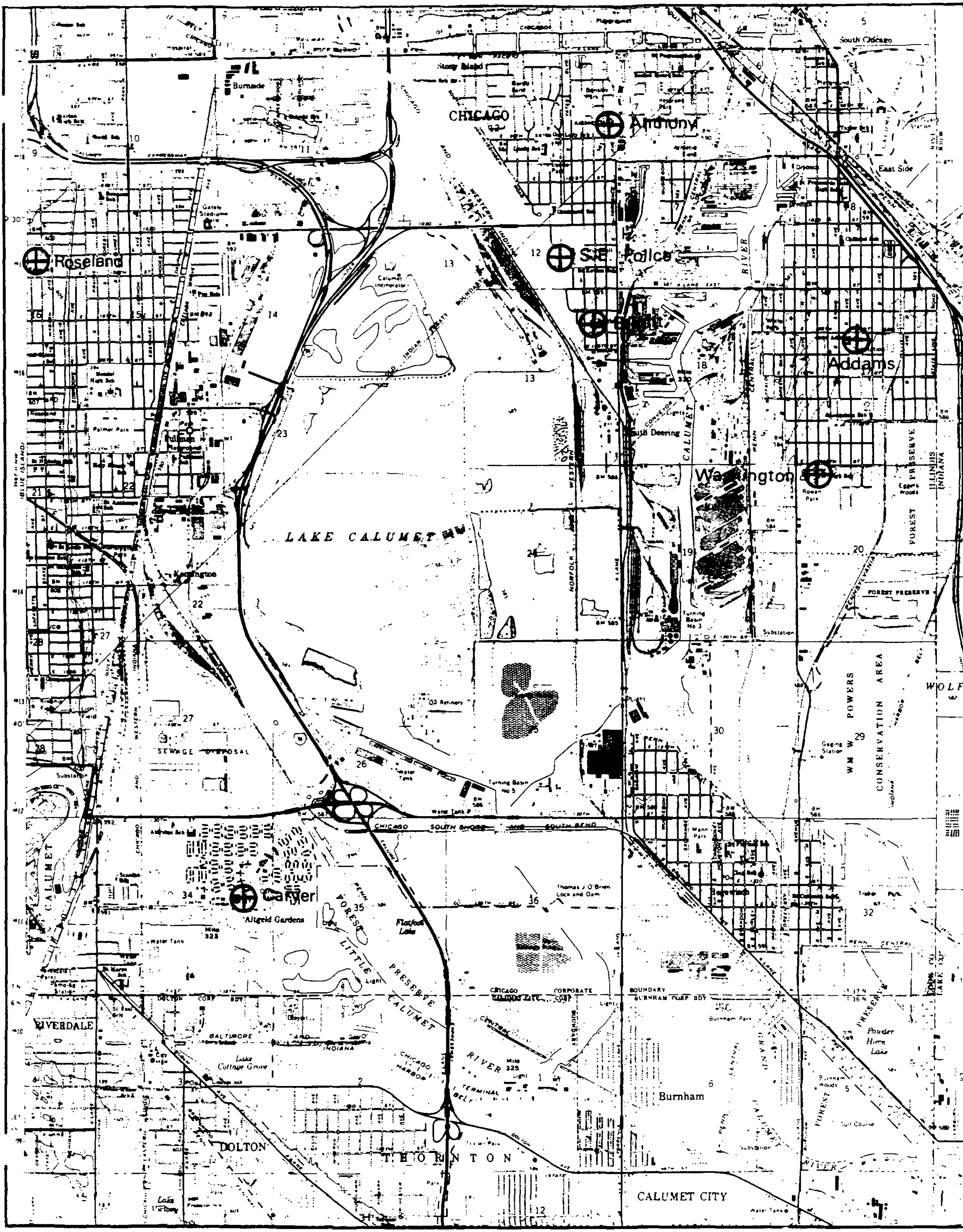


FIGURE 6.3

South Chicago Ambient Air Monitoring Network in 1983

Total suspended particulate, PM_{10} and NO_2 data are of the noncontinuous type; that is, the monitors collect an integrated sample over a 24-hour period which is normally a calendar day. Samples are collected on a USEPA nationally coordinated sampling schedule which specifies samples to be collected once every six days, translating to about 60 sampled days per year.

Continuous measurements are made for SO_2 and O_3 and are reported as hourly averages. The monitors utilized are either reference method instruments or equivalent, as required by the USEPA, and are subjected to the statewide quality assurance program.

6.3.2 Air Quality Summary and Trends

The following criteria pollutants are currently being monitored in the study area and have historical data from which to determine trends: total suspended particulates (TSP), lead (Pb), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), and ozone (O_3). The only criteria pollutant not currently monitored in the study area is carbon monoxide (CO). In addition to criteria pollutants, trace analyses are performed on the TSP filters for sulfates, nitrates, copper, iron, and manganese.

Although TSP concentrations have been decreasing significantly since 1976, as late as 1980 all four sites in the study area exceeded the primary annual standard (Table 6.2). In 1984, only the Washington H.S. site in the study area exceeded the primary annual standard. A decrease is also apparent in the peak 24-hour averages as represented by the second high value for each year (Table 6.3). Year-to-year fluctuations are inherently greater in the short-term averages; however, the short-term values have been lower in the most recent years, especially 1981, 1982 and 1984.

Lead concentrations are also decreasing as represented by the peak quarterly averages in each year (Table 6.4). Violations of the current lead standard were recorded in 1974 and 1975 but there have been no violations since then. The area average of the peak quarterly lead values has decreased to less than a third of the standard in the last three years.

Since no air quality standards exist for the TSP trace element analyses (other than lead), the study area averages are compared to Illinois statewide averages (Table 6.5). On this basis, the study area averages for the trace constituents listed are consistently higher than the statewide averages.

Sulfur dioxide has been monitored with continuous instruments in the study area for less than three years, an insufficient time to determine trends. However, the most recent data indicates SO_2 concentrations well below the annual and 24-hour primary standards and the 3-hour secondary standard (Table 6.6).

Ozone has been monitored at two different sites since 1978. Although one of the sites, Roseland Pump Station, is located outside the study area, the data should be representative of the area. There is no clear trend since 1978 in either the peak concentrations or the number of days exceeding the standard (Table 6.7). Some years have been below the standard and other years have been above the standard.

Nitrogen dioxide has been monitored at Addams Elementary School since 1974 (Table 6.8). The annual averages had an upward trend from 1974-1979, followed by a downward trend from 1979-1984. The annual primary standard was not exceeded during any of the years. The trend in NO_2 levels in the study area parallels that of other areas of Chicago and Cook County during this time period. However, the magnitude of NO_2 concentrations in the study area has generally been lower than in some other parts of Chicago and Cook County.

Table 6.2

Total Suspended Particulate Trends

Site	Address	Annual Geometric Means (ug/m^3)										
		0974	0975	0976	0977	0978	0979	0980	0980	0982	0983	0984
Addams Elementary School	10810 S. Ave H	129	105	131	118	108	107	94	86	78	78	75
Anthony Elementary School	9800 S. Torrence	95	86	90	88	88	96	96	84	66	68	68
Carver High School	801 E. 133rd Place	73	73	91	83	85	92	96	75	71	--	70
Washington High School	3500 E. 114th St.	153	148	175	170	121	129	119	111	86	93	85
Study Area Average		113	103	122	115	101	106	101	89	75	80	75

Table 6.3

Total Suspended Particulate Trends

Site	Address	Second-High 24-Hour Average (ug/m^3)										
		0974	0975	0976	0977	0978	0979	0980	0980	0982	0983	0984
Addams Elementary School	10810 S. Ave H	318	229	494	351	244	220	188	177	189	265	179
Anthony Elementary School	9800 S. Torrence	250	197	202	248	230	330	226	175	155	190	148
Carver High School	801 E. 133rd Place	211	167	317	285	199	248	373	164	193	215	209
Washington High School	3500 E. 114th St.	506	367	452	688	278	294	226	229	198	317	233
Study Area Average		321	240	366	393	238	273	253	186	184	247	192

Table 6.4

Lead Trends

Site	Address	Maximum Quarterly Average (ug/m^3)										
		0974	0975	0976	0977	0978	0979	0980	0980	0982	0983	0984
Addams Elementary School	10810 S. Ave H	.90	.80	.50	.40	.70	.73	.48	.39	.41	.55	.44
Anthony Elementary School	9800 S. Torrence	1.70	.70	.80	.40	.90	1.00	1.10	.49	.44	.41	.33
Carver High School	801 E. 133rd Place	.70	.50	.60	.40	.70	.80	.65	.32	.28	.38	.35
Washington High School	3500 E. 114th St.	1.60	1.60	1.20	1.20	.80	.91	1.18	.89	.81	.66	.68
Study Area Average		1.23	.90	.78	.60	.78	.86	.85	.52	.49	.50	.45

Table 6.5

Total Suspended Particulate Trace Analyses

		1982 Annual Arithmetic Means (ug/m^3)				
Site	Address	Sulfate	Nitrate	Copper	Iron	Manganese
Addams Elementary School	10810 S. Ave H	13.6	6.3	.29	1.06	.18
Anthony Elementary School	9800 S. Torrence	10.9	6.0	.25	.80	.12
Carver High School	801 E. 133rd Place	11.8	6.4	.36	.75	.11
Washington High School	3500 E. 114th St.	13.7	6.6	.11	1.79	.27
Study Area Average		12.5	6.3	.25	1.10	.17
Illinois Statewide Average		10.5	5.0	.21	.75	.05

Table 6.6

Sulfur Dioxide Trends

Site	Address	Annual Arithmetic Means (ppm)			
		0980	0982	0983	0984
Southeast Police Station	103rd and Luella	+	.008	.008	.008

Site	Address	Second-High 24-Hour Averages (ppm)			
		0980	0982	0983	0984
Southeast Police Station	103rd and Luella	.064	.061	.050	.053

Site	Address	Second-High 3-Hour Averages (ppm)			
		0980	0982	0983	0984
Southeast Police Station	103rd and Luella	.119	.106	.107	.126

+ Insufficient data for valid annual average

Table 6.7

Ozone Trends

Site	Address	Maximum Hourly Average (ppm) 0978	0979	0980	0980	0982	0983	0984
Roseland Pump Station[A]	351 W. 104th St.	.159	.111	--	.167	--	--	--
Southeast Police Station	103rd and Luella	--	--	--	--	.119	.163	.114

Site	Address	Number of Days with Hours ˉ0.02 ppm 0978	0979	0980	0980	0982	0983	0984
Roseland Pump Station[A]	351 W. 104th St.	10	0	--	2	--	--	--
Southeast Police Station	103rd and Luella	--	--	--	--	0	2	0

-- Site not in operation during year
[A]Site not located in study area, but data should be representative of study area

Table 6.8

Nitrogen Dioxide Trends

Site	Address	Annual Arithmetic Means (ppm)										
		0974	0975	0976	0977	0978	0979	0980	0980	0982	0983	0984
Addams Elementary School	10810 S. Ave H	.031	.031	.034	.038	.037	.045	.036	.031	.028	.030	.029

6.3.3 Summary of Health Effects Associated with Violations of the NAAQS

6.3.3.1 Particulate Matter

Particulate matter in the atmosphere consists of solids, liquids, and liquids-solids in combination. Suspended particulates generally refer to particles less than 100 microns in diameter (human hair is typically 100 microns thick). Particles larger than 100 microns will settle out of the air under the influence of gravity in a short period of time. Particles which cause the most health and visibility difficulties are those less than 1.0 microns in size because they can penetrate to the deep lung. These particles are also the most difficult to reduce in numbers by the various industrial removal techniques. Rainfall-washout accounts for the major removal of these smaller particles from the air. Particulate pollutants enter the human body by way of the respiratory system and their most immediate effects are upon this system. The size of the particle determines its depth of penetration into the respiratory system. Particles over 5 microns are generally deposited in the nose and throat. Those that do penetrate deeper in the respiratory system to the air ducts (bronchi) are often removed by ciliary action. Particles ranging in size from 0.5 - 5.0 microns in diameter can be deposited in the bronchi, with few reaching the air sacts (alveoli). Most particles deposited in the bronchi are removed by the cilia within hours. Particles less than 0.5 microns in diameter reach and may settle in the alveoli. Removal of particles from the alveoli is much less rapid and complete than from the larger passages. Some of the particles retained in the alveoli are absorbed into the blood.

Besides particulate size, the oxidation state, chemical composition, concentration, and length of time in the respiratory system contribute to the health effects of particulates. In addition, the presence of other pollutants in the atmosphere, especially sulfur dioxide (SO_2), may affect the hazard posed by particulates. In fact, because particulates and SO_2 are almost always present together, it has been difficult to determine what the health effects are of particulates alone.

Epidemiological studies have demonstrated that excessive particulate levels have been associated with increased mortality and sickness, particularly among the elderly and the chronically ill. Aggravation of chronic respiratory diseases (asthma, bronchitis, emphysema) and heart diseases are most commonly associated with particulate pollution.

6.3.3.2 Sulfur Dioxide

Once in the atmosphere, some SO_2 can be oxidized (either photochemically or in the presence of a catalyst), to SO_3 (sulfur trioxide). With water vapor present, SO_3 is readily converted to sulfuric acid mist. Other basic oxides combine with SO_3 to form sulfate aerosols. Sulfuric acid droplets and other sulfates are thought to account for about 5 to 20 percent of the total suspended particulate matter in urban air. Additionally, these compounds can be transported long distances and come back to earth as a major constituent of acid precipitation. Many of the resultant health problems attributed to SO_2 may be a result of the oxidation of SO_2 to other compounds.

The effects of SO_2 on health are irritation and inflammation of tissue that it directly contacts. Inhalation of SO_2 causes bronchial constriction resulting in an increased resistance to air flow, reduction of air volume, and an increase of respiratory rate and heart rate.

Sulfur dioxide can exacerbate pre-existing respiratory diseases (e.g., asthma, bronchitis, and emphysema). The enhancement (synergism) by particulate matter of the toxic response to SO_2 has been observed under conditions which would promote the conversion of SO_2 to sulfuric acid. The degree of enhancement is related to the concentration of particulate matter. A twofold to threefold increase of the irritant response to SO_2 is observed in the presence of particulate matter capable of oxidizing SO_2 to sulfuric acid.

Sulfuric acid inhalation causes an increase in the respiratory system's mucous secretions, which reduces the system's ability to remove particulates via mucociliary clearance. This can result in an increased incidence of respiratory infection.

6.3.3.3 Carbon Monoxide

The toxic effects of high concentrations of carbon monoxide (CO) on the body are well known. Carbon monoxide is absorbed by the lungs and reacts with hemoglobin (the oxygen carrying molecule in the blood) to form carboxyhemoglobin (COHb). This reaction reduces the oxygen carrying capacity of blood because the affinity of hemoglobin for CO is over 200 times that for oxygen. The higher the percentage of hemoglobin bound up in the form of carboxyhemoglobin, the more serious is the health effect.

The level of COHb in the blood is directly related to the CO concentration of the inhaled air. For a given ambient air CO concentration, the COHb level in the blood will reach an equilibrium concentration after a sufficient time period. This equilibrium COHb level will be maintained in the blood as long as the ambient air CO level remains unchanged. However, the COHb level will slowly change in the same direction as the CO concentration of the ambient air as a new equilibrium of CO in the blood is established.

The lowest CO concentrations shown to produce adverse health effects result in aggravation of cardiovascular disease. Studies demonstrate that these concentrations have resulted in decreased exercise time before the onset of pain in the chest and extremities of individuals with heart or circulatory disease. Slightly higher CO levels have been associated with decreases in vigilance, ability to discriminate time intervals, and exercise performance.

Evidence also exists indicating a possible relationship between CO and heart attacks, the development of cardiovascular disease, and fetal development.

Studies on the existing ambient levels of CO do not indicate any adverse effects on vegetation, materials, or other aspects of human welfare.

6.3.3.4 Nitrogen Oxides

There is a lack of strong evidence associating health effects with most nitrogen oxide compounds (NO_x). NO_2, however, has been clearly established as exerting detrimental effects on human health and welfare.

NO_2 can cause an impairment of dark adaptation at concentrations as low as 0.07 ppm (parts per million). NO_2 can cause an increase in airway resistance, an increase in respiratory rate, an increase in sensitivity to bronchoconstrictors, a decrease in lung compliance, and an enhanced susceptibility to respiratory infections. NO_2 is a deep lung irritant capable of producing pulmonary edema if inhaled in sufficient concentrations. When NO_2 is inhaled in concentrations with other pollutants, the effects are additive.

NO_x may also react with water to form corrosive nitric acids, a major component of acid precipitation. Additionally, NO_x and various other pollutants (e.g., hydrocarbons) may react in the presence of sunlight to produce photochemical oxidants. These are extremely unstable compounds which damage plants and irritate both the eyes and respiratory system of people. Ozone and a group of chemicals called peroxyacetylnitrates (PAN) are the major constituents of photochemical oxidants.

6.3.3.5 Ozone

Injury to vegetation is one of the earliest manifestations of photochemical air pollution, and sensitive plants are useful biological indicators of this type of pollution. The visible symptoms of photochemical oxidant produced injury to plants may be classified as: (1) acute injury, identified by cell collapse with subsequent development of necrotic patterns (visible damage caused by the death of tissue); (2) chronic injury, identified by necrotic patterns or with other pigmented patterns; and (3) physiological effects, identified by growth alterations, reduced yields, and changes in the quality of plant products. The acute symptoms are generally characteristic of a specific photochemical oxidant, though chronic injury patterns are not. Ozone injury to leaves is identified as a strippling or flecking. Adverse effects on sensitive vegetation have been observed from exposure to photochemical oxidant concentrations of about 100 ug/m^3 (0.05 ppm) for four hours.

Adverse effects on materials (rubber products and fabrics) from exposure to photochemical oxidants have not been precisely quantified, but have been observed at the levels presently occurring in many urban atmospheres (including the study area).

Ozone accelerates the aging of many materials, resulting in rubber cracking, dye fading, and paint erosion. These effects are linearly related to the total dose of O_3 and can occur at very low levels, given long duration exposures.

Ozone is a pulmonary irritant that affects the respiratory mucous membranes, other lung tissues and respiratory functions. Clinical and epidemiological studies have demonstrated that O_3 impairs the normal mechanical function of the lung, causing alterations in respiration, the most characteristic of which are shallow, rapid breathing and a decrease in pulmonary compliance (ability of the lung to expand and contract during normal breathing). Exposure to O_3 results in clinical symptoms such as chest tightness, coughing, and wheezing. Alterations in airway resistance can occur, especially to those with respiratory diseases (asthma, bronchitis, emphysema). These effects may occur in sensitive individuals, as well as in healthy exercising persons, at short-term ozone concentrations between 0.15 and 0.25 ppm.

Ozone exposure increases the sensitivity of the lung to bronchoconstrictive agents such as histamine, acetycholine, and allergens, as well as increasing the individual's susceptibility to bacterial infection. Simultaneous exposure to O_3 and SO_2 can produce larger changes in pulmonary function than exposure to either pollutant alone.

6.3.3.6 Lead

Lead is a stable compound which persists and accumulates both in the environment and in the human body. Lead enters the human body through ingestion and inhalation with consequent absorption into the blood stream and distribution to all body tissues. Clinical, epidemiological and toxicological studies have demonstrated that exposure to lead adversely affects human health.

Low level lead exposure has been found to interfere with specific enzyme systems and blood production. Kidney and neurological cell damage has also been associated with lead exposure. Animal studies have demonstrated that lead can contribute to reduced fertility and birth defects. Children are the population segment most sensitive to many of lead's adverse effects.

Other serious potential effects from lead exposure are behavioral. Brain damage has been well documented in cases of severe lead poisoning in children. Restlessness, headaches, tremors, and general symptoms of mental retardation have been noted. The brain seems to be particularly sensitive to lead poisoning, yet it is unclear whether low level exposure will result in brain disfunction. Although evidence exists which indicates that children with above-normal blood lead levels are more likely to demonstrate poor academic performance, the studies remain inconclusive.

6.4 Discussion of Pollutant Transport Mechanisms and Associated Analytical Techniques

6.4.1 Meteorology

The Chicago study area is along the southwest shore of Lake Michigan and occupies a plain which, for the most part, is only some tens of feet above the lake. Lake Michigan averages 579 feet above mean sea level. Topography does not significantly affect air flow in or near the study area, except that lesser frictional drag over Lake Michigan causes winds to be frequently stronger along the lakeshore, and often permits air masses moving from the north to reach shore areas an hour or more before affecting western parts of the city.

Chicago is in a region of frequently changeable weather. The climate is predominately continental, ranging from relatively warm in summer to relatively cold in winter. However, the continentality is partially modified by Lake Michigan, and to a lesser extent by other Great Lakes. In late autumn and winter, air masses that are initially very cold often reach the city only after being tempered by passage over one or more of the lakes. Similarly, in late spring and summer, air masses reaching the city from the north, northeast or east are cooler because of movement over the Great Lakes. Very low winter temperatures most often occur in air that flows southward to the west of Lake Superior before reaching the Chicago area. In summer, the higher temperatures are with south or southwest flow and are therefore not influenced by the lakes, the only modifying effect being a local lake breeze. Strong south or southwest flow may overcome the lake breeze and cause high temperatures to extend over the entire city.

During the warm season, when the lake is cold relative to land, there is frequently a lake breeze that reduces daytime temperature near the shore, sometimes by 10° or more below temperatures farther inland. When the breeze off the lake is light, this effect usually reaches inland only a mile or two, but with stronger on-shore winds the whole city is cooled. On the other hand, temperatures at night are warmer near the lake so that 24-hour averages on the whole are only slightly different in various parts of the city and suburbs.

In summer, a combination of high temperature and humidity may develop, usually building up progressively over a period of several days when winds continue out of the south or southwest, becoming oppressive for one or perhaps several days, then ending abruptly with a shift of winds to northwest or northerly. The change may be preceded or accompanied by thundershowers. High relative humidity often results from wind flow off the lake, but the air is then cooler and not oppressive.

Chicago Midway Airport, which is approximately 10 miles northwest of the study area, has complete climatological records available. The annual mean temperature at Chicago Midway Airport is 50°F, and the monthly normal mean temperatures range from 26° in January to 76° in July. In January, the mean daily maximum temperature is 33°, the mean minimum 19°. In July, the corresponding figures are 86° and 66°. The lowest official temperature ever recorded is -23°, measured downtown in December of 1872. The highest temperature to occur at Midway Airport since it became the official station is 104° in June of 1953, but an official record of 105° was recorded at The University of Chicago on July 24, 1934, and a still higher temperature of 109° occurred on July 23, 1934 at Midway Airport before it was the official station. The average annual number of days at Midway Airport with 0° or lower is 7, and with 90° or higher is 26. The number of days with 90° or higher is considerably less near the lake shore. The normal number of heating degree days is 6,113.

Precipitation that falls in the study area normally results from air that has passed over the Gulf of Mexico. But, in winter, there is sometimes snowfall, light inland but locally heavy near the lakeshore, with Lake Michigan as the principal moisture source. The heavy lakeshore snow occurs when colder air moves from the north with a long trajectory over Lake Michigan and impinges on the Chicago lakeshore. In this situation, the air mass is warmed and its moisture content increased up to a height of several thousand feet. Snowfall is produced by upward currents that become stronger because of frictional effects, when the air moves from the lake onto land. This type of snowfall, therefore, tends to be heavier and to extend farther inland in south-shore areas of the city and in Indiana suburbs, where the angle between wind-flow and shoreline is greatest. The effect of Lake Michigan, both on winter temperatures and lake-produced snowfall, is enhanced by non-freezing of much of the lake during the winter, even though areas and harbors are often ice-choked. This type of local heavy snowfall may occur once or a few times in a normal season.

Summer thundershowers are often locally heavy and variable; parts of the city may receive substantial rainfall and other parts none. Longer periods of continuous precipitation are mostly in autumn, winter, and spring. About one-half the precipitation in winter, and about 10 percent of the yearly total precipitation, falls as snow. Snowfall from month to month and year to year is greatly variable. There is a 50 percent likelihood that the first and last 1-inch snowfall of a season will occur by December 5 and March 20, respectively. The corresponding dates for the first and last 3-inch snowfall are December 24 and March 2. Freezing rain sometimes occurs but is usually light. During the cold season, slight melting and refreezing of precipitation is a fairly common hazard to highway traffic.

Fog is infrequent. Visibility is much more often restricted by local air pollution, a condition that is worst during the heating season, but which continues throughout the year because of extensive industrial activity.

The amount of sunshine is moderate in summer and quite low in winter. A considerable amount of cloudiness, especially in winter, is locally produced by the lake effect. Days in summer with no sunshine are rare. The total sunshine in December, partly because of shorter days, is only a little over one-third the July total.

For much of the time in autumn, winter and spring, smoke and other air pollution is carried away by winds, sometimes rapidly; however, on some occasions when there is little or no wind, the pollution accumulates, especially during night and early morning hours. Summertime air pollution may be less, partly because of lesser output, but also because of better vertical dispersal; on the other hand, on many summer days surface wind flow converges into the city, preventing or lessening horizontal outflow at the ground.

Additionally, during warm summer days, odors emanating from industrial areas and landfills can be trapped just after sunset when winds die down and near ground level inversions start to form. The decreased dispersion associated with these meteorological phenomena often results in short-term odor episodes.

6.4.2 Transport Mechanisms

Air pollutants are transported from their point of origin by the action of the wind. Different meteorological conditions are conducive to varying degrees of pollutant dispersion depending upon source configuration and type. For instance, TSP emissions from flat bare areas increase directly with wind speed (i.e., mechanical force). Ground level emissions often have their greatest impact during early evening hours when the dispersion ability of the atmosphere is decreased due to light winds and ground level inversions. Emissions from industrial boilers and processes are frequently at high temperatures which enhances plume rise. High stacks and plume rise allow the pollutant to become diluted before reaching ground level, resulting in lower concentrations at farther distances from the source than would be possible with ground level emissions. Turbulent meteorological conditions may result in lower concentrations downwind of a source, but they can also result in higher maximum concentrations near the source. Mechanical turbulence from wind passing over a building and stacks can cause a plume to be "downwashed," resulting in higher concentrations. Some pollutants may be transformed or leave the plume during transport. Particulates may fall out of a plume. Sulfur dioxide undergoes chemical reactions which may decrease the SO_2 concentrations and form small particulates in the process. Transport mechanisms are dependent upon meteorological conditions, source configuration, and pollutant mix.

6.5 Current Air Pollution Control Programs Affecting the Study Area

6.5.1 Permit Program

The Illinois Pollution Control Board's regulations for air pollution control require permits for the construction and operation of most sources of air pollution or equipment designed to control air pollution. Construction permits are to be obtained before construction is commenced on a new or modified source. Operating permits are required when the source begins operation and must be periodically renewed. Failure to hold appropriate permits is grounds for enforcement under the Illinois Environmental Protection Act.

Sources typically subject to the permit requirement include boilers at electric utilities, industrial plants, and large institutions; process equipment at petroleum refineries, steel mills and manufacturing plants which release dust or vapor to the air; grain elevators, tank farms and other material storage or handling operations; and incinerators. Air pollution control permits are not currently required for landfills, although they are required for almost all other waste treatment or disposal facilities because of the potential for discharges of vapor or fumes to the atmosphere.

As with the other permit programs, the air permit program serves several functions.

6.5.1.1 Compliance Review

The IEPA is only authorized to issue permits if the applicant provides adequate proof of compliance with substantive air pollution control requirements. Thus, the issuance of a permit implies that substantive requirements applicable to a source have been determined, and the application has shown compliance with these requirements.

6.5.1.2 Permit Conditions

The IEPA is authorized to place conditions on permits as needed to control air pollution. These conditions may simply state the requirements or limitations under which a source is to operate, to avoid future misunderstanding. These conditions may to a certain extent also require testing, recordkeeping, etc., to verify compliance or additional control measures to respond to the circumstances of the particular source.

6.5.1.3 Information Gathering

Permit applications provide a basic supply of information about sources of pollution. This goes beyond identification of the source and compliance information to include quantity, quality and location of pollutant discharges generally. Although air permit applications are most directed at air emissions and control of criteria pollutants, they sometimes provide information about industrial processes and the presence of hazardous materials.

Plants located in the study area which currently have permits from the Division of Air Pollution Control are listed in Appendix F (the TAS emissions inventory).

6.5.2 Field Operations Section Operating Program

The Field Operations Section (FOS) functions within the guidelines of an Operating Work Plan. Although structured along definite guidelines, this Work Plan contains built-in flexibility to allow prioritizing of actual day-to-day activities in response to the changing aspects of environmental problems.

6.5.2.1 Work Plan

The Work Plan is a systematic attempt to organize FOS's daily activities. Its framework is carefully reviewed, evaluated and prioritized each year in light of the IEPA's goal of protecting the air environment. The Work Plan provides for the detailed inspection of each and every major facility in nonattainment areas at least once a year on a priority basis. The frequency of inspection may be increased to further assess compliance, to monitor facilities' programs, or to review compliance with operating permit conditions. Inspections of major facilities in areas attaining the National Ambient Air Quality Standards and which have a history of good compliance may be deferred to once every 24 months, provided that no complaints are received and no observations of non-compliance are noted.

Table 6.9 is an excerpt from the Work Plan. It lists the investigative priorities in the study area for Fiscal Year 1984.

Facilities which pose a significant health threat are given the highest priority in the Work Plan.

Several major facility categories are given special emphasis in the Work Plan. From time to time, special investigative task forces are put together to deal with the complex air pollution problems of large facilities such as steel mills, chemical plants, and power plants. Additionally, special attention may be focused on particular pollutants across the board. For example, over the last several years, the Work Plan has emphasized reductions in total suspended particulate (TSP) and hydrocarbon (HC) emissions in the Chicago area. Since mid-1980 in southeast Cook County, there have been more than 1100 investigations at over 100 major TSP emitting facilities. During this time, TSP emissions in this area have been reduced approximately 40 percent. Correspondingly, throughout the Chicago area, there have also been more than 850 investigations at over 190 major HC emitting facilities designed to enhance compliance with applicable emission limitations. Overall HC emissions during this period have been reduced about 50 percent.

Table 6.9

FY '84 Work Plan Investigative Priorities
in the Southeast Chicago Study Area

Type	Actual No. of Facilities	Work Plan Frequency	Expected No. of Inspections for the Year
1. Task Force (Steel Mills)	4	12	48
2. Toxics/Hazard	1	4	4
3. Violators (Substantive)	5	4	20
4. NESHAPS	0	3	0
5. On Program	2	4	8
6. Multimedia Problems	7	3	21
7. NSPS	0	1	0
8. TSP Chicago		1	
9. HC Chicago	15	1	15
10. Random		1	
11. A-1 Facilities	17	1	17
12. A-2 Nonattainment	13	1	13
13. Service Station (incl. in B Facilities)		1	
14. Special Request (incl. in B Facilities)		1	
15. A-2 Attainment	0	1	0
16. B Facilities	029	1	029
TOTAL:	193		275

6.5.2.2 Incident Response

Every air pollution incident (e.g., major malfunctions of pollution control equipment, industrial spills, etc.) reported to FOS or a multimedia (more than one Agency Division) problem which may endanger the public health is investigated with the highest priority under the Work Plan.

6.5.2.3 Stack Testing

FOS routinely witnesses and evaluates stack tests. Usually, sampling is conducted by the facility to demonstrate compliance with existing rules and regulations. Tests may be requested by the Permit Section for development of operating permit conditions or, as a result of an enforcement or variance action, may be ordered by the Illinois Pollution Control Board, or may be conducted by a facility for obtaining design criteria data and for establishing operating rates for assuring compliance.

6.5.2.4 Continuous Monitoring

FOS maintains records of malfunctions of air pollution control equipment and/or processes. On an on-going basis, FOS evaluates and follows-up on reported malfunctions, issues Compliance Inquiry Letters, and assesses the need for the installation of continuous monitoring equipment. Compliance with permit conditions requiring the keeping of records regarding system malfunctions and preventive maintenance practices is routinely monitored and enforced.

6.5.2.5 Citizen Complaints

The handling of complaints is a very important aspect of FOS activities. Increasingly, many inspections which originate from a complaint are now conducted under the multimedia format where field personnel from more than one Agency Division conduct inspections together, to focus on complex problems related to more than one of the media. This is especially true in the Southeast Chicago study area where there is a concentration of landfill operations, heavy industry and hazardous waste treatment facilities.

The area covered by this study represents a little over one-half of one percent of the State's total geographic area, and less than one percent of the statewide population. About 3-1/2 work years per year of surveillance effort is allocated to the study area. This represents about 12 percent of the total for the State.

6.5.2.6. Compliance Status of Major and Significant Facilities in the Southeast Chicago Study Area

The latest air pollution emissions inventory lists about 193 facilities in the Southeast Chicago study area. Of the 193 facilities, 22 facilities are actual 100-ton per year emitters (designated A-1 Facilities under the Work Plan); 18 facilities have potential emissions after controls of less than 100 tons per year (A-2 Facilities under the Work Plan); 22 facilities are significant sources having actual and potential emissions below 100 tons per year, but falling under the categories of multimedia, toxic/hazardous, HC or fugitive dust emitters. The remaining 131 are minor facilities.

Minor Facilities

Minor facilities are given the lowest priority in the Agency's Work Plan. They are not inspected regularly, and many have been inspected for inventory purposes only. When problems are uncovered during these investigations, follow-up is handled under established Work Plan priorities. Where apparent violations are observed, an initial Compliance Inquiry Letter (CIL) is sent and usually an adequate facility response is sufficient compliance action.

Of the 131 minor facilities in the Southeast Chicago study area, 70 had been inspected as of September 1, 1983. Of the 70 investigated, 52 were determined to be in compliance, 12 were found to be in violation of substantive regulations, and 4 facilities were found to be deficient in not having IEPA permits. About 70 percent of the minor facilities uncovered with substantive problems have since corrected the violations, and the remaining 30 percent are being sent a second CIL.

Major and Significant Facilities

Even as early as September of 1983, all the major and significant facilities had been inspected at least once. Investigations of facilities with major and significant violations frequently surpass by many times the minimum frequency of inspection set out in the Work Plan.

Of the 62 major and significant facilities, 12 facilities have substantive violations, 12 facilities have permit violations only, and 38 facilities are in compliance. Seven of those facilities with substantive violations are now on approved compliance programs. The five facilities with no programs have violations that were uncovered after August of 1983. All of these, however, have responded indicating that they are formulating programs and formal submissions to the IEPA are under development. The 12 facilities with permit deficiencies are being sent follow-up Compliance Inquiry Letters.

6.6 Air Pollution Additional Studies (November 0973)

6.6.1 Introduction

An air toxic sampling program was initiated in the Lake Calumet area of Chicago in late November of 1983 for the purpose of determining the type and amount of selected toxic contaminants in the air. This program represented an innovative first effort by the State to measure air toxic contaminant levels. Severe time constraints necessitated that the program be carried out quickly and, thus, it should be noted that the study was not intended to be exhaustive. Resource limitations dictated the selection of only a few sampling days.

This sampling program consisted of two parts. The first part involved an on-site continuous sample collection and measurement program conducted by TRC Environmental Consultants, Inc. using their TAGA 6000 MS-MS mobile monitoring laboratory. The second part involved the laboratory analysis of samples collected during the summer months of 1983 at four routine sampling sites located in the Lake Calumet area and identified in Section 6.3 of this chapter. The mobile laboratory portion of the sampling program was aimed at identifying and quantifying volatile organic compounds from a list of 31 components. This list of target compounds is presented in Table 6.10. This list was compiled by the USEPA and is known as the "List of Potential Non-Criteria Air Pollutants". The samples collected during the summer of 1983 were analyzed for dioxin, arsenic, beryllium, nickel, cadmium, chromium, and polychlorinated biphenyls (as a group). The following paragraphs provide an overview of the sampling program and summarize the results.

6.6.2 Air Sampling Program

6.6.2.1 Mobile Toxic Monitoring

The Illinois EPA and Illinois Department of Energy and Natural Resources contracted with TRC Environmental Consultants, Inc. to sample for the period November 13-29, 1983 at 22 locations in the Lake Calumet area. These locations are listed in Table 6.11. The sampling strategy involved locating the mobile laboratory at one of the 22 locations and sampling for 2 to 4 hours during periods when the selected site would be downwind from a potential source of toxic contaminants. During the period the mobile laboratory was sampling, wind speed and direction measurements were also taken.

6.6.2.2 Airborne Dust Analysis

The Chicago Department of Consumer Services operates four airborne dust sampling sites near the Lake Calumet area. These sites are located at Washington High School, Old Carver High School, Addams School, and Anthony School. Nineteen samples were selected from the period February - July, 1983. These samples were analyzed for dioxin, arsenic,

Table 6.10

Air Quality Survey Target Compounds

a. acetaldehyde
b. acrolein
c. acrylonitrile
d. alkyl chloride
e. benzyl chloride
f. carbon tetrachloride
g. chlorobenzene
h. chloroform
i. chloroprene
j. cresol (o,p,m)
k. p-dichlorobenzene
l. dimethyl nitrosamine
m. epichlorohydrin
n. ethylene dichloride
o. ethylene oxide
p. formaldehyde
q. hexachlorocyclopentadiene
r. methyl chloroform
s. methylene chloride
t. nitrobenzene
u. nitrosomorpholine
v. perchloroethylene
w. phenol
x. phosgene
y. propylene oxide
z. toluene
aa. trichloroethylene
bb. vinylidene chloride
cc. xylenes (o,p,m)
dd. benzene
ee. vinyl chloride

Table 6.11

Sites Monitored During Air Quality Survey

Site Number	Name	Location
1	O'Brien Lock and Dam	134th and Calumet River
2	Burnham	Croissant Road
3	Cottage Lake Grove	South Edge of Lake
4	Mann Park	130th Street/Exchange St.
5	Williams W. Powers Conservation Area	
6	G. Washington School	115th Street/Avenue L
7	Bright School	108th Street/Calhoun Street
8	Trumball Park	103rd Street/Bensley Avenue
9	Burnham School	VanVlissinger Blvd./95th St.
10	Luella Park	100th Street/Oglesby
11	Arcade Park	111th Street/Lawrence
12	G.W. Carver School	130th Street
13	Sherwin Williams	113th Street/Corliss
14	Bright School	108th Street/Calhoun
15	Addams School	108th Street/Ewing
16	G. Washington School	115th Street/Avenue L
17	Dolton City Hall	Dolton Road
18	Dolton	Michigan Street/136th Street
19	SCA Incinerator	122nd Street
20	Anthony School	97th Street
21	Sherwin Williams	113th/Corliss Street
22	Mann Park	130th Street/Exchange Street

beryllium, nickel, polychlorinated biphenyls (as a group), cadmium, and chromium. The analyses of these 24-hour samples provide some measure of high air pollution impact at these four sites since the samples were taken when the predominant wind direction was from potential sources of toxic pollutants. That is, when the wind was blowing from the Lake Calumet or steel mill area and the TSP (total suspended particulates) readings were high.

6.6.3 Results and Conclusions

1. The mobile monitoring laboratory detected the presence of toluene, benzene, xylene, and acetone. Acetone was not one of the target compounds listed in Table 6.10 but was measured because its identity was distinguishable and daily tests with standards for acetone were successful in confirming its presence. The levels of the measured pollutants are shown in Table 6.12. The levels presented in Table 6.12 may be compared to the multimedia environmental goals (MEG) presented in Table 6.13. MEGs, as used in this report, describe levels of contaminants that are predicted by USEPA not to produce negative effects in the surrounding populations or ecosystems. MEGs are not regulations; rather, they are designed for use in ranking chemicals on the basis of predicted environmental acceptability. The average pollutant levels for the area should be compared to the MEG Ambient Level Goals while the maximum pollutant levels may be compared to the Minimum Acute Toxicity Concentrations for Air. The levels measured are all below these MEG values.

   Table 6.14 compares the levels of toluene, xylene and benzene measured in the study to levels found by the USEPA in other cities and another location in Chicago. A statistical comparison of the pollutant levels found in these ten cities and southeast Chicago shows that the values measured in southeast Chicago were not significantly greater (p less than 0.05) than the levels found in the ten cities.

2. The results of the airborne dust chemical analysis showed that no detectable limits of polychlorinated biphenyls or dioxin were present. Levels of arsenic, beryllium, cadmium, chromium and nickel were all found above the minimum detectable level of the analytical technique. Although the concentrations of these contaminants varied considerably from sample to sample, none of the values were extremely high. The results of the filter analyses are shown in Table 6.15. This table also compares the ambient levels found for arsenic, beryllium, cadmium, chromium and nickel to both TLV/300 and TLV/420. The threshold limit value (TLV) are occupational exposure standards established by the American Conference of Governmental Industrial Hygienists for pollutants which have not had a NAAQS promulgated. They are designed to protect the worker from adverse health effects for an 8-hour workday and 40-hour workweek. The TLV/300 represents the level that has been used by some local, state, and federal agencies as a guideline for safe ambient levels in lieu of National Ambient Air Quality Standards. TLV/420 may be viewed as equivalent to a MEG. All levels measured were below both TLV/300 and TLV/420.

3. The nature of the emissions sources in the Lake Calumet area of Chicago is such that, even though this air monitoring study did not find harmful levels of air contaminants, it cannot be assumed that harmful levels never exist. To obtain a more substantial understanding of the air quality in this area, it will be necessary to locate longer-term sampling stations (such as those operated for airborne dust) to provide a larger data base from which more definite conclusions on the quality of the air can be derived.

Table 6.12

Quantitative Results for Air Quality Survey by Site

Site	Date	Toluene (ppb)	Benzene (ppb)	Xylene (ppb)	Acetone (ppb)	Other (ppb)
1	Nov. 14	11.7	ND	ND	81.0	-
2	Nov. 15	8.1	8.9	7.8	459.7	-
3[A]	Nov. 15	-	-	-	-	-
4	Nov. 16	6.8	4.1	4.6	313.3	-
5	Nov. 16	2.8	3.7	ND	673.3	-
6	Nov. 16	3.1	3.0	ND	498.3	-
7	Nov. 17	5.9	9.4	6.4	237.0	-
8	Nov. 17	2.6	6.1	ND	180.8	-
9	Nov. 17	ND	ND	ND	268.8	-
10	Nov. 17	5.6	9.8	ND	217.5	-
11	Nov. 18	16.7	ND	ND	158.8	-
12	Nov. 18	5.2	ND	ND	215.0	-
13	Nov. 18	7.8	5.9	ND	182.3	-
14	Nov. 19	6.1	ND	ND	302.6	-
15	Nov. 21	ND	ND	ND	245.0	-
16[B]	Nov. 21	21.7	ND	ND	236.6	-
		368.0	ND	ND	1543.5	-
17	Nov. 22	21.4	15.5	ND	305.0	-
18	Nov. 22	11.7	17.0	ND	193.0	-
19	Nov. 28	3.1	4.2	ND	222.0	-
20	Nov. 28	4.2	6.2	ND	485.8	-
21	Nov. 29	6.4	6.9	ND	123.5	-
22	Nov. 29	4.4	6.2	ND	98.4	-

A Monitoring stopped due to strong wind and rain.

B The arrival of a large number of automobiles with their engines running during the second half-hour of monitoring contributed to the significant increase in concentrations. For this reason, the two sets of values were not averaged.

Table 6.13

MEG Values for Air Quality Survey of Non-Criteria Pollutants
(ppb)

Pollutant	Toluene	Benzene	Xylene	Acetone
Natural background level (ppb)	2.6	0.02	1.2	0.01
Average pollutant concentration found in study area	7.4 A	5.1 A	0.9 A	271.3 A
Ambient level goal based on health effect - toxicity based estimated permissible concentration	240	24	240	600
Ambient level goal based on ecological effect - toxicity based estimated permissible concentration	120	25	-	-
Maximum pollutant concentration found in study area	21.7 (368.0)A	17.0	7.8	673.3 (1543.5)A
Minimum acute toxicity concentration for ambient air based upon health effects	100,000	925	100,000	250,000

[A]The arrival of a large number of automobiles with their engines running during the second half hour of sampling at Washington H.S. on November 21, 1983 contributed to a significant increase in concentrations. For this reason, the values were separated into two data sets and were not used in computing averages.

Table 6.14

Weighted Average Concentrations in Different Cities

	Toluene	Xylene	Benzene
S.E. Chicago/Lake Calumet			
Mean	5.1	0.9	5.1
Max.	21.7	7.8	17.0
Min.	ND	ND	ND
Los Angeles			
Mean	11.7	6.5	6.0
Max.	53.4	62.7	27.9
Min.	1.1	0.6	0.7
Phoenix			
Mean	8.6	6.0	4.7
Max.	38.7	36.2	59.9
Min.	0.5	0.3	0.4
Oakland			
Mean	3.1	2.3	1.6
Max.	16.9	12.3	4.6
Min.	0.2	0.2	<0.1
Houston			
Mean	10.3	5.1	5.8
Max.	65.7	33.6	37.7
Min.	1.0	0.4	0.8
St. Louis			
Mean	1.5	0.5	1.4
Max.	6.4	2.7	5.8
Min.	0.1	0.1	0.1
Denver			
Mean	6.2	4.1	4.4
Max.	24.6	26.8	23.9
Min.	0.3	0.2	0.1
Riverside			
Mean	5.8	3.3	4.0
Max.	20.1	10.5	11.0
Min.	0.4	0.3	0.5
Staten Island			
Mean	9.0	5.4	4.2
Max.	67.3	70.8	19.0
Min.	0.6	0.2	<0.1
Pittsburgh			
Mean	3.9	2.1	5.0
Max.	46.3	14.6	64.6
Min.	0.4	0.2	0.4
Chicago -- 79th and Lawrence			
Mean	4.6	2.3	2.6
Max.	14.8	9.9	8.8
Min.	0.8	0.2	0.6

CITATION:

Singh, H.B., et al. (January, 1983): Measurements of Hazardous Chemicals in the Ambient Atmosphere. SRI International EPA-600/3-83-002.

Table 6.15

Results for Air Quality Filter Analysis

Sample		Concentrations							
Location	Date	TSP ug/SCM[1]	As ng/SCM[2]	Be ng/SCM	Cd ng/SCM	Cr ng/SCM	Ni ng/SCM	PCBs ng/SCM	Dioxin ng/SCM
Addams School	3/18/83	265	10.1	0.3	12.8	26.1	50.8	<1.5	<30.5
	5/24/83	121	2.8	<0.1	2.5	11.8	9.0	<1.5	<30.5
	7/11/83	167	3.2	<0.1	2.0	17.0	14.7	<1.5	<30.5
	7/17/83	120	3.6	<0.1	1.7	11.3	12.3	<1.5	<30.5
	7/29/83	120	3.9	<0.1	2.3	15.4	13.7	<1.5	<30.5
Anthony School	3/1/83	190	6.7	<0.1	6.2	23.2	30.5	<1.5	<30.5
	6/11/83	117	3.0	<0.1	1.0	7.6	4.0	<1.5	<30.5
	7/11/83	119	1.2	<0.1	1.1	6.5	5.1	<1.5	<30.5
	7/29/83	125	2.5	<0.1	2.8	18.0	10.3	<1.5	<30.5
Carver High School	2/23/83	173	5.5	0.3	2.9	26.2	17.3	<1.5	<30.5
	5/12/83	111	3.0	<0.1	1.4	11.3	7.9	<1.5	<30.5
	6/11/83	115	1.2	<0.1	0.9	11.3	2.6	<1.5	<30.5
	6/17/83	146	2.2	<0.1	1.4	11.9	9.0	<1.5	<30.5
	6/23/83	158	2.7	<0.1	2.5	15.6	8.9	<1.5	<30.5
Washington High School	3/1/83	317	12.0	0.2	6.6	41.4	58.0	<1.5	<30.5
	5/24/83	150	11.9	<0.1	2.3	38.0	30.9	<1.5	<30.5
	7/11/83	190	8.3	<0.1	1.3	41.5	27.2	<1.5	<30.5
	7/17/83	185	8.3	<0.1	1.0	22.9	47.0	<1.5	<30.5
	7/29/83	143	5.0	<0.1	1.4	32.9	22.7	<1.5	<30.5
Blank A		-	<0.9	<0.1	<0.1	<1.5	<1.8	<1.5	<30.5
Blank B		-	<0.9	<0.1	<0.1	<1.5	<1.8	<1.5	<30.5
Blank C		-	-	-	-	-	-	<1.5	<30.5
Average concentration			5.1	0.1	2.8	20.5	20.1		
TLV/300 (ng/m^3)			666	7	167	167	3,333		
TLV/420 (ng/m^3)			475	5	119	119	2,380		

1 ug/SCM = micrograms per cubic meter
2 ng/SCM = nanograms per cubic meter

6.7 Supplemental Air Pollution Studies

6.7.1 Introduction

The draft Southeast Chicago study had several suggested follow-up activities for the Division of Air Pollution Control (DAPC) to consider. This section outlines the results of those activities to date (12-85). The follow-up studies that have been done are: (1) a nitrosamine sampling study; (2) PCB sampling in the study area; (3) emission inventory of both criteria and toxic air pollutants/PIPQUIC computer studies; and (4) an odor study of the area.

6.7.2 Nitrosamine Air Sampling

Because the air toxics monitoring performed in November of 1983 gave some indication that there were nitrogen bearing compounds (nitrosamines) possibly emitted near the large landfill sites in the study area, the DAPC subsequently monitored specifically for nitrosamines. This monitoring was done at the Thomas O'Brian Lock which is located to the East and between CID landfills 1 and 2. Monitoring was performed on six occasions: November 27-29, 1984; January 3-4, 1985; January 30-31, 1985; February 28-March 1, 1985; April 3-4, 1985; and April 18-19, 1985.

Sampling was done using a state-of-the-art proprietary sampling cartridge manufactured by the Thermo Electron Corporation. No sample showed any evidence of nitrosamine being present in the atmosphere.

6.7.3 Polychlorinated Biphenyls Air Sampling

The Division of Air Pollution Control initiated an air sampling program for polychlorinated biphenyls (PCBs) in the fall of 1984. Samples were taken at Grissom and Bright Schools using polyurethane foam sample trains. Samples were then taken to an off-site laboratory to be analyzed.

The air samples were collected on occasions when the SCA incinerator was burning wastes containing PCBs. Wind conditions and weather patterns varied each time a sample was taken. Although PCBs were found in 9 of 10 samples collected between November of 1984 and May of 1985, the exact amount of PCBs present could not be reliably determined.

The reason that precise amounts of PCBs present could not be determined was due to a defect in the analysis procedure which was found through detailed quality control checks which are not routinely used in measuring levels of PCBs in the air.

New procedures were developed and a special method validation program was conducted by the Radian Corporation of Austin, Texas which performed the original analysis under contract to IEPA. Test data collected in this validation program provided evidence that the new procedures will provide acceptable results.

The difficulties with the previous analysis for PCBs involved the extraction and concentration steps where a relatively large volume (16 ounces) of liquid containing the sample is reduced to seven one-thousandths of an ounce (4 drops) to provide for the detection of PCBs at extremely low levels. The steps used to concentrate the sample have been found to result in the loss of some of the PCBs. The new procedure limits this loss while specially formulated chemicals, added to the samples at the beginning of the procedure, are monitored in order to provide a reliable measure of the actual extraction and collection efficiency.

The first phase of the PCB air sampling program began in the fall of 1984 and was suspended upon discovery of the deficiency in the analysis procedure. At that time, 11 of the scheduled 16 samples had been collected from two locations in southeast Chicago.

The IEPA resumed the sampling program in mid-October of 1985 using the improved analysis procedures. A third sampling site is being implemented at Carver High School in the Altgeld Gardens area of southeast Chicago. The previous two PCB sampling locations, Bright Elementary School and Grissom Elementary School, will continue to be used in the next round of sampling.

6.7.4 Emissions Inventory of Toxic Air Pollutants

The Illinois Environmental Protection Agency and USEPA, in cooperation, are jointly developing an emissions inventory for the Southeast Chicago study area. When completed, this inventory will serve as the basis for assessing the viability of various emission control strategies.

In addition to the emissions inventory development, the IEPA is working with USEPA staff members involved with GEMS and PIPQUIC to develop the capability to factor risk management into environmental decisions concerning the Southeast Chicago study area. GEMS is a computerized system of models which can be used to determine environmental impacts (both media specific and multimedia). PIPQUIC is a multimedia relational data base for both pollutants and population. It contains assessment ranking packages and the capability to perform "what if" types of analyses.

6.7.5 Odor Study

The draft study of this area suggested that the IEPA undertake an analysis of the odor problems of the Southeast Chicago study area. At the time the draft study was written, the IEPA was not prepared to undertake such an analysis. Subsequent to the distribution of the draft document, the DAPC elected to undertake a study of the odor problems in the area. One basis for this decision was the large number of complaints received by the DAPC's field staff. The odor study program was begun in the summer of 1985.

6.7.5.1 Elements of the Southeast Chicago Odor Study

The study, which is designed to provide additional insight into the odor problems in the Southeast Chicago study area, is composed of three elements: (1) use of an odor log; (2) precise measurements of on-site meteorological data; and (3) correlation of the odor logs with the meteorological data.

6.7.5.1.1 Odor Log

Members of the general public in the study area have been provided with odor logs to use when reporting the occurrence of an odor episode. Each log sheet consists of an original and two carbon copies. One of the copies is retained as a record by the individual making the report. The other two copies are provided to the IEPA. The log includes the time and location of occurrence and describes the type of odor encountered.

6.7.5.1.2 Meteorological Data

The IEPA has installed an instrumented meteorological tower at Bright School within the study area. This tower measures both wind speed and direction that is specific to the study area. Alternate meteorological data is also available from the National Weather Service Station at O'Hare Airport and from other IEPA meteorological sites in and around Chicago.

6.7.5.1.3 Correlation of Data

Using both the odor logs and the wind data, odor pollution logs will be generated. Wind roses will be developed that describe the compass directions from which each odor is thought to have come. Once the source of odor has been identified and verified, the IEPA can pursue a program of mitigation.

7.0 Cancer Mortality in Selected Community Areas of Southeast Chicago, 0968-0982

A Detailed Analysis and Review of a Previous Study

In response to a request from the IEPA, the Illinois Department of Public Health (IDPH) conducted a review of selected mortality statistics from the southeast Chicago area.

7.1 Introduction

During the summer of 1984, a preliminary report by the Department of Public Health on cancer mortality was released as part of the IEPA's draft report on southeast Chicago (1). The study reported an excess rate of cancer for selected community areas of Chicago when compared with the rates for the entire city. The study area consisted of six community areas of Chicago: Pullman, South Deering, East Side, West Pullman, Riverdale and Hegewisch.

To follow up the preliminary report, the Division of Disease Control and the new Division of Epidemiologic Studies of the Illinois Department of Public Health performed a further detailed review of cancer mortality in the study area. The review involved four separate studies. The University of Illinois School of Public Health and the Illinois Cancer Council were involved in one of the subsequent studies.

First, a reanalysis of cancer mortality was performed which used methods similar to the preliminary study. Second, a time trend analysis of cancer mortality rates assisted in the interpretation of cancer rates within the six community areas of southeast Chicago. Third, a detailed analysis of cancer mortality by specific cancer types was done for each age, race and sex group of the community areas within the study area. The University of Illinois School of Public Health and the Illinois Cancer Council assisted the Illinois Department of Public Health in the third study. Lastly, a separate study of cancer mortality was performed for one census tract of South Deering on the northeast side of Lake Calumet; the analysis was requested by Mr. Edward Vrdolyak and Mr. Ed Hernandez.

Unlike the first preliminary study, these additional analyses have corrected for the major influences of age, race and sex on the occurrence of cancer in southeast Chicago. Not correcting for these influences will result in incorrect estimates of cancer rates. These additional studies have also taken a closer look at specific types of cancer. The previous analysis used a manual process to perform over 1,000 calculations; the additional analyses have used over 24,000 calculations using computer programs.

7.2 Methods

The cancer trend analysis derived age-adjusted mortality rates for each race, sex and community area for the time periods 1968-72, 1973-77 and

1978-82. The Chicago population was used as the standard. The following major cancer sites were used in the trend analysis: lung, colon, stomach, pancreas, bladder, leukemias and all cancers. The analysis was very limited due to the small number of cancers observed for each five year period. The average community area had fewer than 10 deaths from certain cancers (stomach, pancreas, bladder or leukemias) for each five year period. To stabilize the large variability in age-adjusted cancer mortality rates, all community areas were combined and then compared to the overall rates for the city of Chicago.

The reanalysis and detailed studies compared the observed and expected number of cancer deaths in each community. The expected number of cancer deaths was obtained by applying age, race and sex-specific cancer mortality rates for Chicago to the number of persons of similar age, race and sex within each community area, respectively. Expected numbers of deaths were calculated for each five year period for 1968-72, 1973-77 and 1978-82. Total expected cancer deaths were summed across age groups for each time period and across the 15 year period. The cancers included in these studies were: esophagus, stomach, large intestine, rectum, liver, pancreas, lung, connective tissue, breast, prostate, bladder, brain, non-Hodgkin's lymphoma, multiple myeloma, leukemias, other sites, oral cavity and pharynx sites, all digestive sites, all respiratory sites, all genitourinary sites, and all lymphatic and hematopoietic tissue sites.

The differences between the observed number of deaths and the expected numbers were tested using standard statistical techniques. When the expected number of deaths was fewer than five, a poisson distribution was used to determine the significance level (2). When the expected number of deaths was five or more, the Chi Square test with one degree of freedom was used (3). To limit the number of false positive findings from multiple comparisons, a higher significance cutoff level (p less than 0.01) was used. The reported findings from the detailed study also required significant differences in two five-year time periods or in one time period and the total 15 year period.

7.3 Results

The findings from the four additional studies are presented as separate sections. A summary is provided at the end of this report which draws on the findings of the four separate studies.

The demographics of the six community areas are different; these differences greatly influence the cancer mortality rates in each area. Table 7.1 shows the differences by race, age and population sizes. The community areas with larger populations will generally experience a higher number of cancer deaths than smaller populations. The community areas with higher proportions of elderly people or with larger black populations may also experience more cancer deaths. Pullman, West Pullman and South Deering have experienced a reduction in their white populations between 1970 and 1980. East Side and Hegewisch have fairly stable, elderly white populations. Table 7.2 shows the number of total cancer deaths for each time period for each community area in southeast Chicago. A total of 2,976 cancer deaths occurred over a 15 year period in residents of the six community areas under study.

Table 7.1

Demographic Characteristics of
Selected Community Areas of Chicago

Community Area No.	Name	Percent White 0970	Percent White 0980	Percent Over 45 Yrs. 0970	Percent Over 45 Yrs. 0980	Population Size 0970	Population Size 0980
50	Pullman	51	19	28	27	10,893	10,341
51	S. Deering	83	31	29	24	19,271	19,400
52	East Side	99	94	36	40	24,649	21,331
53	W. Pullman	83	6	34	27	40,318	44,904
54	Riverdale	5	3	12	13	15,018	13,539
55	Hegewisch	99	97	38	38	11,346	11,572

Table 7.2

Number of Cancer Deaths by Selected
Community Areas of Chicago, 1968-1982

Community Area No.	Name	Cancer Deaths by Period 1968-72	1973-77	1978-82	Total
50	Pullman	105	74	94	273
51	S. Deering	171	126	159	456
52	East Side	245	260	278	783
53	W. Pullman	384	305	264	953
54	Riverdale	47	55	54	156
55	Hegewisch	99	126	130	355
	Total	1,051	946	979	2,976

Source: Illinois Department of Public Health

7.3.1 Reanalysis of the Preliminary Study

Several problems were found in the preliminary study. There had been little time to complete the study, which forced the analysis to be limited in scope. Errors in the calculations of age-standardized rates were noted; the rates were not adjusted for sex or race. The analysis of "urinary organs" also included reproductive and genital sites of cancer; the other broad site groupings included many types of cancer for which there are no known "associations with environmental factors". Presenting the findings as age-adjusted rates was somewhat artifactual. These rates did not truly represent the real cancer rate but were used for comparison purposes only.

To overcome these problems, the reanalysis took a different approach. The analysis presents the actual number of cancer deaths that occurred for each community area. The observed number of deaths are then compared to the number of expected cancer deaths which are derived from age, race and sex-specific cancer mortality rates for the city of Chicago. Thus, the comparison is to the number of expected cancer deaths if the community area had experienced the same rate of cancer deaths as Chicago.

Table 7.3 presents the findings of the reanalysis and contrasts these results to the preliminary study. The previously reported excess of cancer mortality rates for community area 53 -- West Pullman -- was no longer present. There was a large influx of non-whites (see Table 7.1) which explains the excess when racial differences of cancer rates are not taken into account. The previously reported excess of all cancer deaths for community area 54 -- Riverdale -- was no longer present, again from higher rates of cancer death in non-white populations (see Table 7.1). However, the reanalysis did find a significant excess of respiratory cancer deaths across all six community areas, an excess of genitourinary cancers in community area 55 (predominantly prostate cancers in men and bladder cancers in women), and an excess of all cancers deaths in community area 55 -- Hegewisch. These findings are further supported by the more detailed analyses in this report.

7.3.2 Trends in Cancer Mortality

Because of the instability of mortality rates with small numbers of deaths for each five year period, the analysis of cancer trends used all community areas combined (A) and compared them to Chicago (C). Figure 7.1 shows the trend in cancer mortality rates to be similar in both sexes, but males generally had higher rates than females. Figures 7.2 and 7.3 show that non-whites had higher cancer mortality rates than whites for both sexes. There were no significant differences between the study area and Chicago age-adjusted cancer mortality rates. Figure 7.4 shows the trends of lung cancer deaths, colon cancer deaths and other cancer deaths (stomach, pancreas, bladder and leukemia) for the study area. The trends were very similar to Chicago trends. These trends were not very different from national trends in cancer mortality. Figure 7.5 shows the variability in cancer mortality rates for each of the six community areas. The City of Chicago rates would be plotted right through the middle of the community area rates. The small chart on rank orders of community areas for each time period also showed the wide variability in rates with no consistent or significant trends.

Table 7.3

Comparison of Preliminary Report and Reanalysis

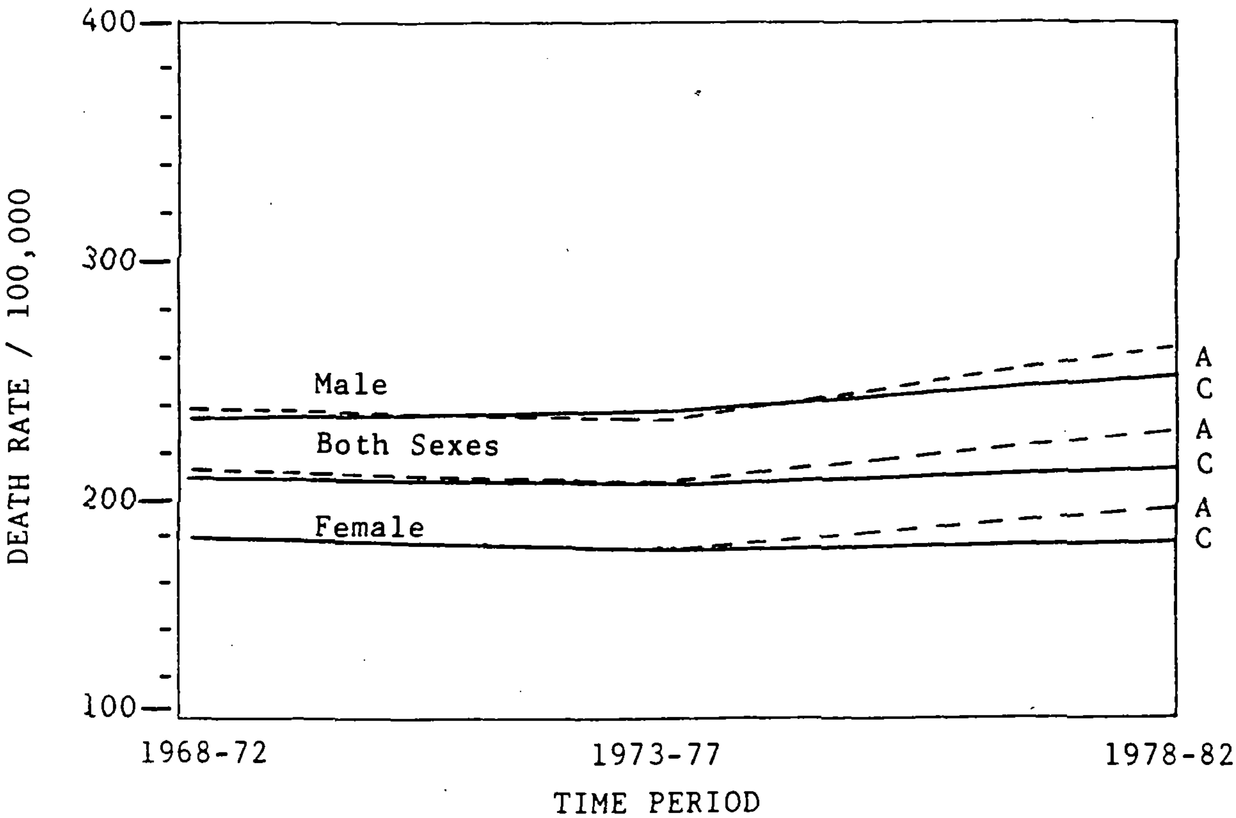
Cancer Site	Community Area	Rate[1]	Cancer Deaths[2] Observed	Expected
Digestive Organs	50	55.49	77	85.5
	51	53.20	124	133.5
	52	44.38	220	223.4
	53	83.11*	270	286.7
	54	47.48	41	45.0
	55	55.56	114	92.9
	50-55	-	846	867.0
Respiratory Organs	50	55.35	79	68.4
	51	53.17	126	108.9
	52	43.03	185	177.4
	53	72.36	254	233.3
	54	40.74	32	35.9
	55	37.39	84	78.2
	50-55	-	760*	702.1
Genital & Urinary Organs	50	29.47	45	44.5
	51	30.61	63	69.2
	52	28.66	132	113.4
	53	46.80*	144	147.4
	54	49.53	32	26.6
	55	32.08	67*	47.2
	50-55	-	483	448.3
All Cancers	50	151.0	273	279.1
	51	186.67	456	449.3
	52	173.09	780	740.5
	53	289.84*	953	953.1
	54	222.83*	146	155.8
	55	174.10	355*	316.5
	50-55	-	2963	2894.3

*Significant differences (p less than 0.05)
[1]Preliminary report for the period 1969-1981 used age-adjusted cancer mortality rates and the Chicago 1970 population was the standard.

[2]The reanalysis used the actual number of cancer deaths. The expected number of cancer deaths was derived from using Chicago age, race and sex-specific rates applied to the Community Area population for time periods 1968-72, 1973-77 and 1978-82.

Source: Illinois Department of Public Health

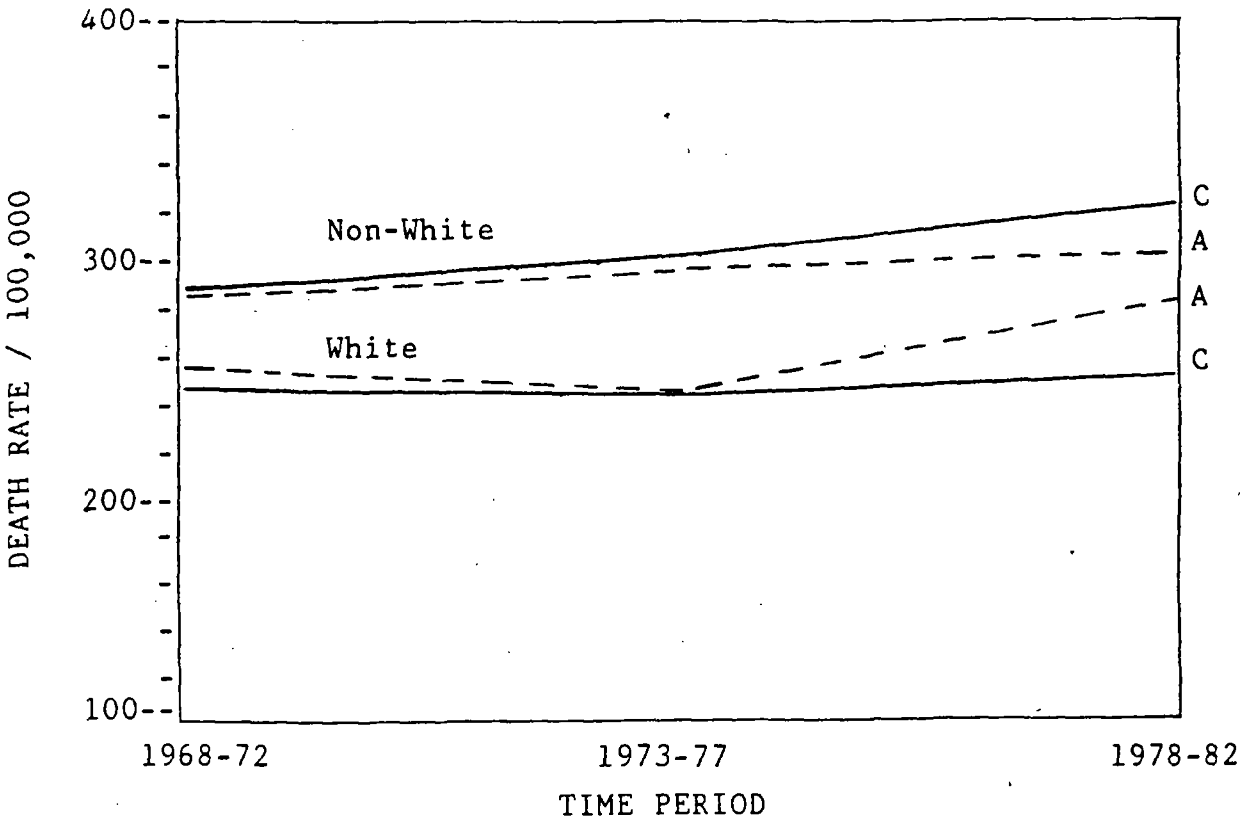
FIGURE 7.1
TRENDS IN AGE-ADJUSTED CANCER MORTALITY RATES
BY SEX, STUDY AREA AND CHICAGO
1968-82



A = Study Area
C = Chicago

Source: Illinois Department of Public Health

FIGURE 7.2
TRENDS IN CANCER MORTALITY RATES* FOR MALES
BY RACE, STUDY AREA AND CHICAGO
1968-82

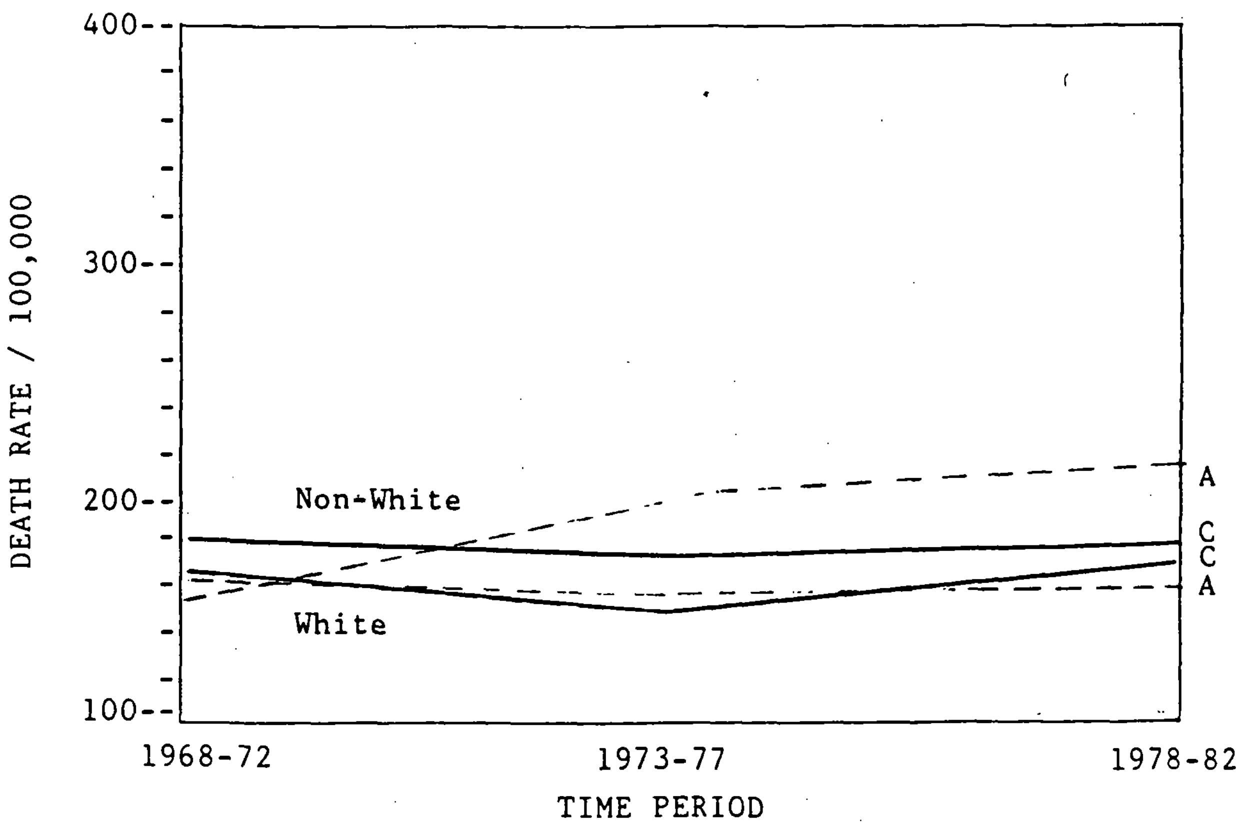


A = Study Area
C = Chicago

*Age Adjusted to Chicago 1970 Population

Source: Illinois Department of Public Health

FIGURE 7.3
TRENDS IN CANCER MORTALITY RATES* FOR FEMALES
BY RACE, STUDY AREA AND CHICAGO
1968-82

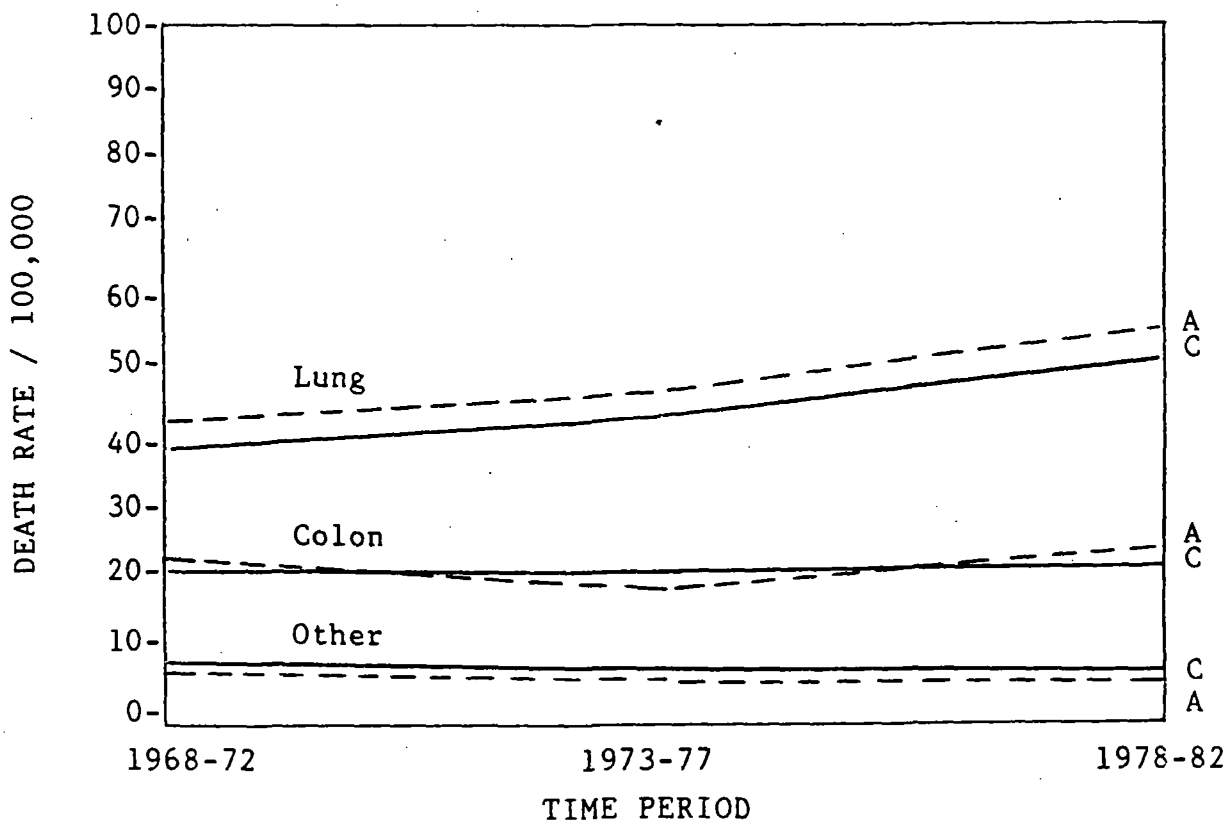


A = Study Area
C = Chicago

*Age Adjusted to Chicago 1970 Population

Source: Illinois Department of Public Health

FIGURE 7.4
TRENDS IN CANCER MORTALITY RATES* BY SITE, STUDY AREA AND CHICAGO
1968-82



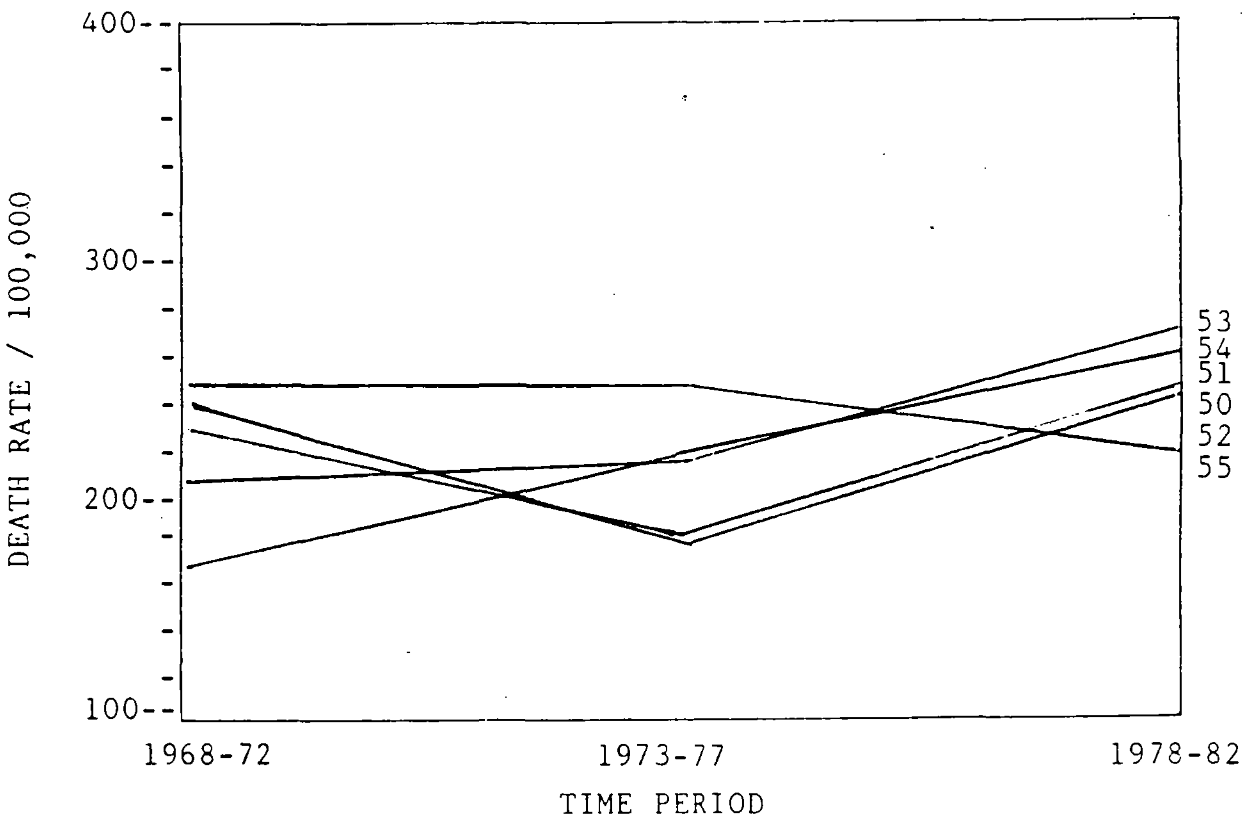
'Other' represents Stomach, Pancreas, Bladder and Leukemia

A = Study Area
C = Chicago

*Age Adjusted to Chicago 1970 Population

Source: Illinois Department of Public Health

FIGURE 7.5
TRENDS IN CANCER MORTALITY RATES*
BY CHICAGO COMMUNITY AREAS (50-55)
1968-82



Rank Order of Rates by Community Area for Each Time Period

	Rank Order by Period		
Area	1968-72	1973-77	1978-82
50	2	6	4
51	3	5	3
52	5	4	5
53	4	3	1
54	6	2	2
55	1	1	6

*Age Adjusted to Chicago 1970 Population

Source: Illinois Department of Public Health

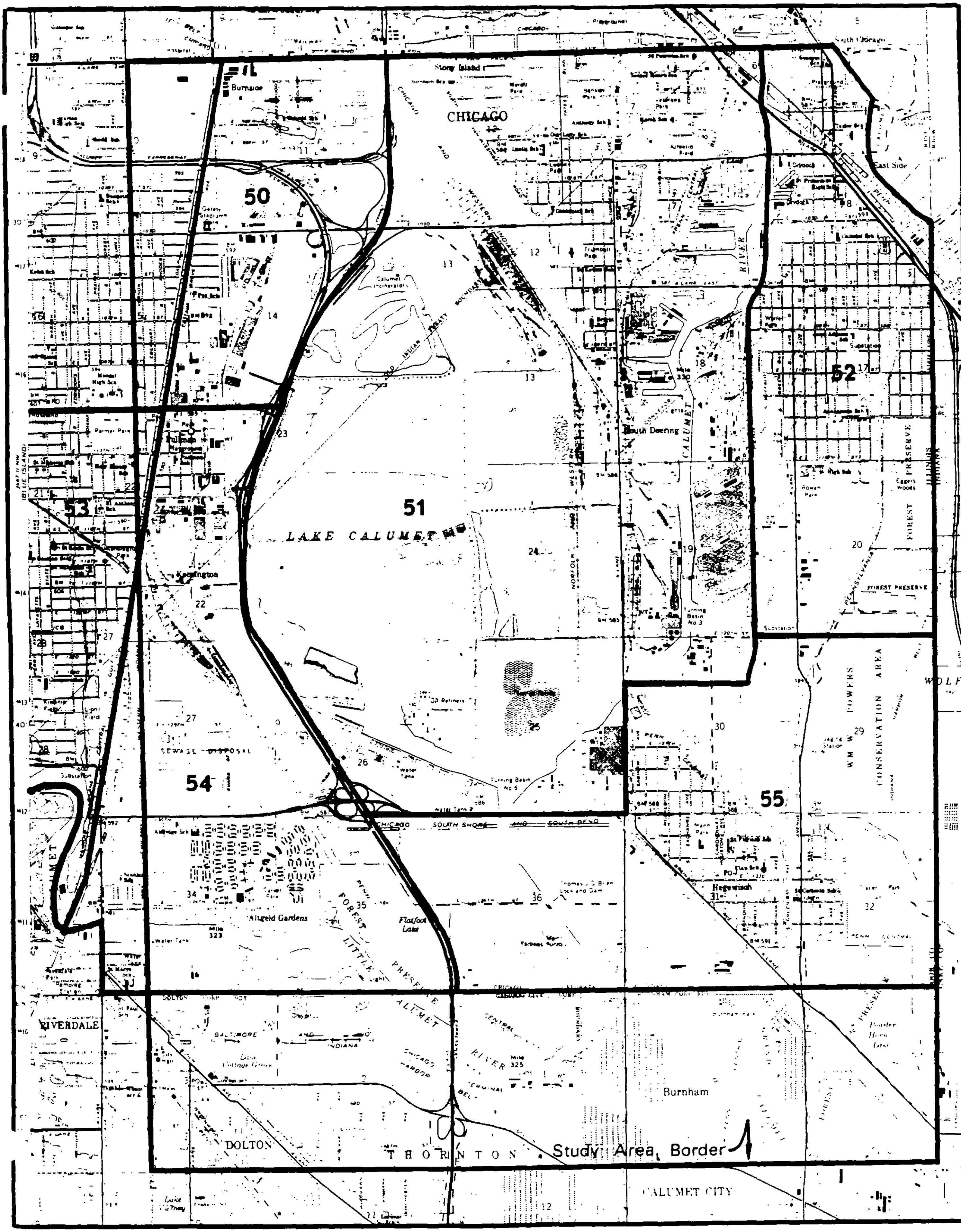


FIGURE 7.6

Community Areas in the South Chicago Study Area

7.3.3 Detailed Analysis of Cancer Mortality

A detailed analysis was performed on the six community areas using seven age groups, race, sex, three time periods and 23 cancer sites or groupings. The level of significance had to be high (p less than 0.01) in order to reduce the chance of false positive findings. In addition, a significant finding had to be consistent over at least two time periods (five year periods or the 15 year period). Over 500 statistical tests were performed in the computer analysis.

Table 7.4 shows the community areas where significant excesses of cancer mortality occurred. Lung cancer mortality was significantly high for white males in the five combined community areas (50-53, 55) which had sizable white populations. The remaining community area (54) was principally a non-white population that had cancer mortality rates similar to non-white rates for Chicago. Bladder cancer mortality was significantly high for white females in the same combined five community areas. Prostate cancer deaths were significantly elevated for white males in community area 55 -- Hegewisch. There were no other community areas in which significant and consistent excesses in cancer deaths were identified from the detailed analysis.

7.3.4 Analysis of Cancer Mortality for One Census Tract

To evaluate a potential cluster of cancer deaths, census tract 5105 in South Deering was studied. A residential area of concern was located between 103rd and 109th Streets which lies within the boundaries of the census tract. The census tract boundaries are the C&NW Railway, 103rd Street, South Torrence, 104th Street, South Muskegon, 106th Street and South Torrence back to the railway tracks. An analysis of an area smaller than a census tract was not possible since the population census file and death certificates have data coded only to the census tract level. The years 1968 to 1982 were used for the analysis.

Table 7.5 shows the number of cancer deaths which occurred in residents of this census tract area. There were 64 male and 43 female cancer deaths over the 15 year period; three males and one female were non-white. Table 7.6 shows the number of observed and expected cancer deaths. There were no significant excesses of cancer deaths in males or females. The finding of six excess lung cancer deaths was in the same direction as the excess found in all five community areas combined.

7.4 Summary of Four Additional Studies

1. The combined findings of these four different analyses support the existence of excess cancer mortality in the study area of Southeast Chicago.

2. Lung cancer deaths were significantly greater for white males in the study area than would be expected for men of similar age in Chicago. Figure 7.4 showed a consistently higher lung cancer mortality rate for the study area when it was plotted against all of Chicago. This excess may be related to occupational exposures in the distant past or to a higher proportion of cigarette smoking history in this male population.

3. Bladder cancer deaths were found to be in excess for white females. This excess may be related to previous occupational exposures or some other factors as yet unknown.

4. An excess of prostate cancers was found in elderly white males in Hegewisch. There are no known environmental associations with this form of cancer, although some occupational associations have been reported in the medical literature.

These findings generally support an excess of lung cancer deaths in white males and bladder cancer deaths in white females. From other published research studies, these two types of cancer have been associated with environmental exposures to carcinogenic substances, primarily smoking tobacco and chemicals in the workplace. If another common environmental exposure (such as air or water) was associated with these excess cancers, we would have expected to find an excess in both males and females and in both whites and non-whites. The fact that the excess in lung cancer mortality occurred only in white males suggests that scme factor unique to this subgroup, such as smoking tobacco or previous occupational exposures, might account for the excess. Similar risks might also explain the excess bladder cancer found in white females. However, since no excess lung cancer risk was found for white females, it is not likely that this group smoked more cigarettes on the average than other white females in Chicago. Some other factor, such as occupational exposures, may be more likely to account for the excess bladder cancer risk in white females.

There are several limitations to these studies. Each of the studies analyzed mortality data. There are many cancer patients who do not die from their disease and would not be included in these types of analyses. Cancer patients who die outside the study area after moving away are not included in the study. Since the length of residence is also unknown for those persons who died from cancer, they may have moved there recently or lived there all their lives. Cancer is a disease which takes many years to develop, usually 15 to 30 years. There are many potential risk factors which cannot be considered when studies use death certificates. A statewide cancer registry would offer better information to assess cancer risks. However, the registry is under development and may take several years before more precise studies can use newly diagnosed cancers.

Table 7.4

Community Areas of Southeast Chicago with
Statistically Significant Excesses of Cancer Mortality, 1968-1982

Cancer Site	Area	Race/ Sex	Cancer Deaths	
			Observed	Expected
Lung	50-53, 55	WM	440*	370.5
Prostate	55	WM	25*	12.6
Bladder	50-53, 55	WF	25*	13.8

*Significant differences (p less than 0.01)

Source: Illinois Department of Public Health

Table 7.5

Cancer Deaths in Census Tract 5105
of South Deering, Chicago, 1968-1982

Cancer Site	Total Male	Total Female
Stomach	4	1
Large Intestine	4	5
Rectum	0	1
Liver	2	1
Pancreas	2	0
Lung	26	6
Breast	0	12
Prostate	4	0
Bladder	1	2
Leukemia	2	0
All Other	18	14
All Sites	64	43

Table 7.6

Observed and Expected Cancer Deaths in Census Tract 5105
South Deering, Chicago, 1968-1982

Sex	Cancer Site	Observed	Expected
Male	Lung	26	19.9
Male	All Sites	64	61.1
Female	All Sites	43	55.3

Source: Illinois Department of Public Health

7.5 Recommendations

Based on these findings, we cannot conclude that the excess cancers were due to environmental exposures in the air or water. However, more definitive studies are required before we can assess the nature of the relationship between cancer mortality in these community areas and occupational or environmental exposures. Such studies would require that we examine all cases of lung and bladder cancer in these communities, not just among those who died of these types of cancer. Detailed studies on newly diagnosed cancers would be expensive to conduct without data provided by the cancer registry. There are additional types of studies which will improve our understanding of the observed cancer excesses.

Several recommendations can be made:

1. Cancer mortality of all community areas of Chicago needs to be assessed. The University of Illinois School of Public Health is under contract for this study. The study has been completed and is now undergoing review by the Department of Public Health, prior to publication.

2. Further investigation of cancer and other causes of death within census tracts of the study area should be performed. The USEPA will be conducting such an analysis using selected cancer sites and non-cancer deaths such as acute respiratory infections, chronic renal disease and hypertensive renal disease.

3. The relationships of specific pollutants and health outcomes need to be assessed. The USEPA will create an inventory of air pollutants within the study area and from major sources outside the area. A number of potentially carcinogenic chemicals will be included in the detailed inventory. The analysis and correlation of air pollutants and health outcomes (No. 2 above) by census tract areas will be performed at a later date.

4. The occupational associations with the excess lung and bladder cancer deaths need to be evaluated. The Illinois Department of Public Health will assess the occupational information on the death certificates for these cancer sites and determine if there is any association with a particular occupation. The study has been completed and is now undergoing review by the Department of Public Health, prior to publication.

5. There should be another meeting of environmental officials, health department officials and public representatives after the conclusion of the above studies. The findings should then be presented to the community in a public meeting.

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APPENDIX A

Arsenic (in ppm) in Soil

Grid No.	0-6" depth	6"-2' depth	2'-00' depth
1	16.0	6.0	8.5
2	6.1	6.5	5.4
3	8.5	0.7	8.3
4	15.0	2.9	2.4
5	7.7	-	1.5
6	13.0	3.7	7.7
8	4.5	1.1	2.3
9	12.0	4.7	17.0
10	9.6	19.0	1.7
12	*	*	*
14	8.7	*	*
15	4.9	*	*
16	7.3	8.7	6.4
17	5.4	6.8	6.5
18	6.7	6.7	6.8
19	14.0	9.6	2.7
20	2.4	2.5	2.4
21	6.5	3.7	8.3
22	5.6	30.0	5.9
23	6.5	7.0	4.0
24	7.8	80.0	1.7
25	6.0	2.5	2.0
Total	174.2	202.1	101.6
Mean	8.3	11.2	5.4
Highest	16.0	80.0	17.0
Lowest	2.4	0.7	1.5

*Slag, unable to retrieve sample

Barium (in ppm) in Soil

Grid	0-6" depth	6"-2' depth	2'-10' depth
Grid No. 1	75.0	50.0	50.0
2	75.0	75.0	462.5
3	100.0	450.0	<25.0
4	100.0	<25.0	<25.0
5	75.0	-	<25.0
6	250.0	175.0	25.0
8	Interference	Interference	Interference
9	75.0	<25.0	<25.0
10	75.0	Interference	<25.0
12	*	*	*
14	100.0 (slag)	*	*
15	Interference	*	*
16	75.0	150.0	150.0
17	25.0	<25.0	<25.0
18	75.0	50.0	25.0
19	125.0	100.0	<25.0
20	<25.0	<2.5	<2.5
21 Interference	<2.5	25.0	
22	37.5	<2.5	Interference
23	Interference	100.0	Interference
24	100.0	62.5	<2.5
25	75.0	<25.0	<25.0
Total	1,462.5	1,320.0	942.5
Mean	<86.0	<82.5	<58.9
Highest	250.0	450.0	462.0
Lowest	<25.0	<2.5	2.5

*Slag, unable to retrieve sample

Cadmium (in ppm) in Soil

Grid No.	0-6" depth	6"-2' depth	2'-10' depth
1	<2.5	<2.5	<2.5
2	<2.5	<2.5	<2.5
3	2.5	<2.5	<2.5
4	2.5	<2.5	<2.5
5	2.5	-	<2.5
6	2.5	<2.5	<2.5
8	<2.5	<2.5	<2.5
9	<2.5	<2.5	<2.5
10	<2.5	<2.5	<2.5
12	*	*	*
14	2.5	*	*
15	13.2	*	*
16	<2.5	<2.5	<2.5
17	<2.5	<2.5	<2.5
18	<2.5	<2.5	<2.5
19	<2.5	<2.5	<2.5
20	<2.5	<2.5	<2.5
21	<2.5	<2.5	<2.5
22	<2.5	<2.5	<2.5
23	<2.5	<2.5	<2.5
24	<2.5	<2.5	<2.5
25	<2.5	<2.5	<2.5
Total	63.2	45.0	47.5
Mean	<3.0	<2.5	<2.5
Highest	13.2	-	-
Lowest	<2.5	-	-

*Slag, unable to retrieve sample

Chromium (total) (in ppm) in Soil

Grid No.	0-6" depth	6"-2' depth	2'-10' depth
1	15.5	10.0	16.2
2	18.0	10.0	8.5
3	20.0	5.5	5.5
4	25.0	5.0	2.5
5	35.0	-	3.5
6	37.5	12.5	21.0
8	21.0	18.8	5.0
9	32.0	8.0	<2.5
10	30.0	77.5	3.8
12	*	*	*
14	2,500.0 (slag)	*	*
15	30.0	*	*
16	20.0	21.2	18.5
17	6.2	2.5	5.0
18	12.5	17.5	15.0
19	18.5	8.8	2.5
20	7.5	12.5	2.5
21	5.0	2.5	5.0
22	5.0	5.0	17.5
23	20.0	22.5	5.0
24	10.0	10.0	<2.5
25	22.0	<2.5	<2.5
Total	2,890.7	252.3	144.5
Mean	137.7	14.0	7.6
Highest	2,500.0	77.5	21.0
Lowest	5.0	<2.5	<2.5

(When the 2,500.0 ppm sample is not included in the calculation, the mean becomes 19.54 ppm for the 0-6" depth.)

*Slag, unable to retrieve sample

Copper (in ppm) in Soil

Grid No.	0-6" depth	6"-2' depth	2'-10' depth
1	51.2	52.5	45.0
2	31.8	23.8	22.5
3	57.5	<2.5	5.0
4	50.0	8.8	3.8
5	38.8	-	7.5
6	77.5	27.5	27.5
8	26.2	<2.5	5.0
9	32.5	11.5	2.5
10	32.5	52.5	2.5
12	*	*	*
14	95.0 (slag)	*	*
15	42.5	*	*
16	22.5	43.8	27.5
17	12.5	12.5	10.0
18	20.0	20.0	20.0
19	31.2	15.0	3.5
20	3.8	5.0	3.0
21	12.5	4.0	10.0
22	9.5	7.0	20.0
23	22.5	27.5	5.0
24	25.0	18.8	<2.5
25	28.8	<2.5	2.5
Total	723.8	337.7	225.3
Mean	34.5	18.8	11.9
Highest	95.0	52.5	45.0
Lowest	3.8	<2.5	<2.5

(When the 95.0 ppm sample is not included in the calculation, the mean becomes 31.44 ppm for the 0-6" depth.)

*Slag, unable to retrieve sample

Iron (in ppm) in Soil

	0-6" depth	6"-2' depth	2'-10' depth
Grid No. 1	21,525.0	31,284.0	31,685.0
2	19,486.0	13,837.0	12,251.0
3	25,335.0	9,325.0	8,864.0
4	28,033.0	7,171.1	4,782.9
5	20,572.0	-	6,257.0
6	24,984.0	17,812.0	23,090.0
8	16,645.0	8,309.0	5,120.0
9	20,656.0	13,336.0	4,328.0
10	42,116.0	83,699.0	4,526.0
12	*	*	*
14	174,518.0 (slag)	*	*
15	19,477.0	*	*
16	24,092.0	18,487.0	18,938.0
17	7,860.8	9,147.5	13,027.0
18	13,697.0	17,098.0	16,491.0
19	26,319.0	14,180.0	5,452.0
20	6,193.0	7,606.0	5,565.0
21	6,088.0	3,919.0	9,196.0
22	6,192.0	14,553.0	20,478.0
23	19,075.0	22,150.0	8,786.0
24	14,891.0	21,723.0	4,095.0
25	14,807.7	4,740.8	4,607.0
Total	552,562.5	318,377.4	207,538.9
Means	26,312.5	17,687.7	10,923.1
Highest	174,518.0	83,699.0	31,685.0
Lowest	6,088.0	3,919.0	4,095.0

(When the 174,518.0 ppm sample is not included in the calculation, the mean becomes 18,902.2 for the 0-6" depth.)

*Slag, unable to retrieve sample

Lead (in ppm) in Soil

Grid No.	0-6" depth	6"-2' depth	2'-10' depth
1	220.00	88.50	32.25
2	131.50	133.25	576.00
3	355.98	<7.50	<7.50
4	152.57	15.04	<7.50
5	137.75	-	<7.50
6	278.55	82.39	11.31
8	163.25	10.00	<7.50
9	89.50	33.75	<7.50
10	103.25	110.50	<7.50
12	*	*	*
14	657.00 (slag)	*	*
15	121.25	*	*
16	34.75	294.15	54.75
17	56.78	<7.50	<7.50
18	33.01	26.05	18.73
19	53.25	28.00	<7.50
20	<7.50	16.50	10.00
21	111.25	<12.50	28.50
22	44.75	18.25	<12.50
23	67.00	20.25	<12.50
24	69.25	27.00	<12.50
25	55.84	<7.50	<7.50
Total	2,943.98	938.63	836.54
Mean	140.19	52.15	44.03
Highest	657.00	294.15	576.00
Lowest	33.01	<7.50	<7.50

(When the 657.0 ppm sample is not included in the calculation, the mean becomes 114.35 ppm for the 0-6" depth.)

*Slag, unable to retrieve sample

Manganese (in ppm) in Soil

Grid No.	0-6" depth	6"-2' depth	2'-00' depth
1	420.0	145.0	490.0
2	580.0	445.0	475.0
3	870.0	2,247.5	305.3
4	942.0	241.3	216.8
5	480.0	-	182.5
6	462.5	1,215.0	257.3
8	730.0	6,600.0	465.0
9	600.0	405.0	205.0
10	3,425.0	9,250.0	280.0
12	*	*	*
14	32,600.0 (slag)	*	*
15	1,100.0	*	*
16	190.8	395.0	493.8
17	311.5	266.8	321.5
18	453.5	440.8	403.8
19	445.0	640.0	232.5
20	347.5	450.0	302.5
21	315.0	42.5	295.0
22	135.0	52.5	445.0
23	590.0	480.0	2,325.0
24	390.0	355.0	175.0
25	352.0	045.5	092.0
Total	45,739.8	23,816.9	8,063.0
Mean	2,178.1	1,323.2	424.4
Highest	32,600.0	9,250.0	2,325.0
Lowest	135.0	42.5	175.0

(When the 32,600.0 ppm sample is not included in the calculation, the mean becomes 657.0 ppm for the 0-6" depth.)

*Slag, unable to retrieve sample

Mercury (in ppm) in Soil

Grid No.	0-6" depth	6"-2' depth	2'-00' depth
1	0.10	0.06	0.03
2	0.14	0.08	0.05
3	0.20	0.01	0.02
4	0.07	0.03	0.01
5	0.14	-	0.01
6	0.11	0.29	0.03
8	0.07	0.01	0.01
9	0.08	0.02	0.01
10	0.06	0.03	0.01
12	*	*	*
14	0.02 (slag)	*	*
15	0.27	*	*
16	0.04	0.20	0.02
17	0.02	0.01	0.02
18	0.03	0.05	0.05
19	0.07	0.03	0.01
20	0.01	0.02	0.01
21	0.09	0.02	0.24
22	0.04	0.02	0.02
23	0.05	0.29	0.02
24	0.10	0.09	0.01
25	0.06	0.00	0.00
Total	1.77	1.27	0.59
Means	0.08	0.07	0.03
Highest	0.27	0.29	0.24
Lowest	0.01	0.01	0.01

*Slag, unable to retrieve sample

Nickel (in ppm) in Soil

Grid No.	0-6" depth	6"-2' depth	2'-10' depth
1	<25.0	<25.0	42.5
2	<25.0	<25.0	<25.0
3	<25.0	<25.0	<25.0
4	25.0	<25.0	<25.0
5	<25.0	-	<25.0
6	30.0	<25.0	30.0
8	<25.0	<25.0	<25.0
9	<25.	<25.0	<25.0
10	30.0	75.0	<25.0
12	*	*	*
14	162.5 (slag)	*	*
15	27.5	*	*
16	<25.0	45.0	25.0
17	<25.0	<25.0	<25.0
18	25.0	25.0	25.0
19	25.0	<25.0	<25.0
20	<25.0	<25.0	<25.0
21	<25.0	<25.0	<25.0
22	<25.0	<25.0	<25.0
23	<25.0	25.0	25.0
24	<25.0	<25.0	<25.0
25	25.0	<25.0	<25.0
Total	675.0	520.0	497.5
Mean	32.1	28.9	26.2
Highest	162.5		
Lowest	25.0		

(When the 162.5 ppm sample is not included in the calculation, the mean becomes 25.6 ppm for the 0-6" depth.)

*Slag, unable to retrieve sample

Selenium (in ppm) in Soil

	0-6" depth	6"-2' depth	2'-10' depth
Grid No. 1	0.6	0.6	0.5
2	0.5	0.2	0.3
3	0.7	0.4	5.2
4	1.3	0.3	<0.1
5	0.5	-	0.1
6	0.5	1.3	0.5
8	0.5	4.0	0.2
9	0.7	0.4	<0.1
10	0.6	2.3	0.2
12	*	*	*
14	2.1 (slag)	*	*
15	0.8	*	*
16	0.6	0.5	0.2
17	0.2	0.1	0.2
18	0.6	0.6	0.5
19	0.7	0.4	0.1
20	0.3	0.1	<0.1
21	0.5	0.1	0.2
22	0.4	0.2	0.1
23	0.3	0.2	0.2
24	0.6	0.6	0.1
25	0.6	<0.1	<0.1
Total	13.6	12.4	9.0
Mean	0.65	0.55	0.47
Highest	2.10	4.00	5.20
Lowest	0.20	0.10	<0.10

(When the 2.1 ppm sample is not included in the calculation, the mean becomes 0.58 ppm for the 0-6" depth.)

*Slag, unable to retrieve sample

Silver (in ppm) in Soil

Grid No.	0-6" depth	6"-2' depth	2'-10' depth
1	<2.5	<2.5	<2.5
2	<2.5	<2.5	<2.5
3	<2.5	5.0	<2.5
4	<2.5	<2.5	<2.5
5	<2.5	-	<2.5
6	<2.5	<2.5	<2.5
8	<2.5	3.8	<2.5
9	<2.5	<2.5	<2.5
10	<2.5	<2.5	<2.5
12	*	*	*
14	3.8 (slag)	*	*
15	<2.5	*	*
16	<2.5	<2.5	<2.5
17	<2.5	<2.5	<2.5
18	<2.5	<2.5	<2.5
19	<2.5	<2.5	<2.5
20	<2.5	<2.5	<2.5
21	<2.5	<2.5	<2.5
22	<2.5	<2.5	<2.5
23	<2.5	<2.5	<2.5
24	<2.5	<2.5	<2.5
25	<2.5	<2.5	<2.5
Total	53.8	48.8	47.5
Mean	<2.56	<2.71	<2.5
Highest	3.8	5.0	-
Lowest	<2.5	<2.5	-

(When the 3.8 ppm sample is not included in the calculation, the mean becomes <2.5 ppm for the 0-6" depth.)

*Slag, unable to retrieve sample

Zinc (in ppm) in Soil

Grid No.	0-6" depth	6"-2' depth	2'-00' depth
1	190.0	167.5	105.0
2	132.5	92.5	340.0
3	265.0	2.5	35.0
4	390.0	45.0	17.5
5	202.5	-	27.5
6	212.5	65.0	67.5
8	275.0	15.0	25.0
9	255.0	95.0	17.5
10	177.5	220.0	17.5
12	*	*	*
14	412.5 (slag)	*	*
15	550.0	*	*
16	70.0	125.0	90.0
17	95.0	42.5	65.0
18	105.0	110.0	80.0
19	132.5	52.5	20.0
20	32.5	50.0	20.0
21	200.0	25.0	30.0
22	62.5	35.0	55.0
23	92.5	82.5	32.5
24	167.5	70.0	17.5
25	005.0	20.0	05.0
Total	4,135.0	1,315.0	1,077.5
Mean	196.9	73.1	56.7
Highest	550.0	220.0	340.0
Lowest	32.5	2.5	17.5

(When the 412.5 ppm sample is not included in the calculation, the mean becomes 186.1 ppm for the 0-6" depth.)

*Slag, unable to retrieve sample

APPENDIX B

Time Collected: ______ Lab # 030776

SPECIAL ANALYSIS FORM

Date Collected: 9/27/83 Date Received Sep 30 1983

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
DIVISION OF LAND/NOISE POLLUTION CONTROL

COUNTY: Cook | FILE HEADING: | FILE NUMBER:

SOURCE OF SAMPLE: (Exact Location) Republic Steel
Boring #14

PHYSICAL OBSERVATIONS, REMARKS: Soil 5.0 - 6.5 indication on OVA

30774 - 6 oz Sed
↓ 75 3 THM

TESTS REQUESTED: Organic scan

COLLECTED BY: [illegible] TRANSPORTED BY: [illegible]

LABORATORY

RECEIVED BY: Rnc DATE COMPLETED: 12/12/83 DATE FORWARDED: 12/12/83

Chlorinated hydrocarbon pesticides not detected
PCBs Not detected (<0.1 ug/g)
Volatile organic compounds not detected (<0.06 ug/g)
Base-Neutral and Acid extractables not detected (<5. ug/g)

LPC-8A 4/77 (NOT FOR DATA PROCESSING)

030776

030776

D030775 (soil)

	ppm ug/g (ppm)		
methylene chloride	< 0.06		
1,1-dichloroethane	< 0.06		
dichloroethylene	< 0.06		
chloroform	< 0.06		
1,2-dichloroethane	< 0.06		
1,1,1-trichloroethane	< 0.06		
carbon tetrachloride	< 0.06		
dichlorobromomethane	< 0.06		
trichloroethylene	< 0.06		
dibromochloromethane	< 0.06		
bromoform	< 0.06		
tetrachloroethylene	< 0.06		
Benzene	< 0.06		
Toluene	< 0.06		
Xylenes	< 0.06		
Ethylbenzene	< 0.06		

D030572
D030572
SEP 16 1983

Time Collected: ______ SPECIAL ANALYSIS FORM Lab #

Date Collected: 9-14-83 Date Received

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
DIVISION OF LAND/NOISE POLLUTION CONTROL

COUNTY:	FILE HEADING:	FILE NUMBER:
Cook		

SOURCE OF SAMPLE: (Exact Location)

Grid #15 1.5 - 5.0 ft depth

Wolf Lake

PHYSICAL OBSERVATIONS, REMARKS: soil sample — looks like foundary sand

30571 - 3 THM vials

30572 - 2 clear 6oz SED jars

TESTS REQUESTED: org. scan

COLLECTED BY: Doug Tolan TRANSPORTED BY: Sherry Otto

LABORATORY

RECEIVED BY: Rmc/ms DATE COMPLETED: 11/18/83 DATE FORWARDED: 11/18/83 [illegible]

D030571 Volatile organic compounds not detected (<10 ug/kg ppb)

D030572 PCBs Not detected (<10 ug/kg ppb or <0.01 ug/g ppm)

Chlorinated hydrocarbon pesticides not detected

Aliphatic hydrocarbons $C_{12}-C_{26}$ = 10 ug/g (ppm)

LPC-8A 4/77 (NOT FOR DATA PROCESSING)

D030573
D030574
SEP 16 1983

Time Collected: ______

Date Collected: 9-14-83

SPECIAL ANALYSIS FORM

Lab #

Date Received ______

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
DIVISION OF LAND/NOISE POLLUTION CONTROL

COUNTY:	FILE HEADING:	FILE NUMBER:
Cook		

SOURCE OF SAMPLE: (Exact Location)

Grid #15 0°-0.5 ft depth

Wolf Lake

PHYSICAL OBSERVATIONS, REMARKS: soil sample - looks like foundary sand

30573 - 3 EACH THM VIALS

30574 - 2 EACH 6OZ SED (CLEAR) JARS

TESTS REQUESTED:

COLLECTED BY: Doug Tolan TRANSPORTED BY: Sherry Otto

LABORATORY

RECEIVED BY: RMC/MS DATE COMPLETED: 11/15/83 DATE FORWARDED: 11/15/83

D030573 Volatile organic compounds not detected

D030574 PCBs Not detected

Chlorinated hydrocarbon pesticides not detected

Aliphatic hydrocarbons $C_{12}-C_{26}$ = 1 ug/g (PPM)

Naphthalene = 0.2 ug/g

Phenanthrene/Anthracene = 1 ug/g

LPC-8A 4/77 (NOT FOR DATA PROCESSING)

D030579 Rmc
D030580 Rmc

Time Collected: ______

Date Collected: 9-14-83

Lab # D030580

SPECIAL ANALYSIS FORM

Date Received SEP 14 1983

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
DIVISION OF LAND/NOISE POLLUTION CONTROL

COUNTY:	FILE HEADING:	FILE NUMBER:
Cook		

SOURCE OF SAMPLE: (Exact Location)
Grid #23 0° - 0.5 ft depth
Hoxie Tot Lot

PHYSICAL OBSERVATIONS, REMARKS: soil samples no odor detected
30579 - 3 EACH THM VIALS
30580 - 2 EACH 6OZ CLEAR SED JARS

TESTS REQUESTED:

COLLECTED BY: Doug Tolan TRANSPORTED BY: Sherry Otto

LABORATORY

RECEIVED BY: Rmc/ms DATE COMPLETED: 11/18/83 DATE FORWARDED: 11/18/83 J. Hurley

D030579 - Volatile organic compounds not detected

D030580 PCBs not detected
Chlorinated hydrocarbon pesticides not detected
Aliphatic hydrocarbons C_{12}-C_{26} = 3 ug/g
Phenanthrene / Anthracene = 0.2 ug/g

LPC-8A 4/77 (NOT FOR DATA PROCESSING)

~~30580~~ Rm-

Time Collected: ______ Lab # 30581

SPECIAL ANALYSIS FORM

Date Collected: 9-14-83 Date Received SEP 14 1983

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
DIVISION OF LAND/NOISE POLLUTION CONTROL 30582

COUNTY:	FILE HEADING:	FILE NUMBER:
Cook		

SOURCE OF SAMPLE: (Exact Location)

Grid # 23 0.5 - 2.0 ft.

Hoxie Tot Lot

PHYSICAL OBSERVATIONS, REMARKS: soil samples

30581 - 3 each THM vials

30582 - 2 6oz clear sed jars

TESTS REQUESTED:

COLLECTED BY: Doug Tolan TRANSPORTED BY: Sherry Otto

LABORATORY

RECEIVED BY: Rmc/ms DATE COMPLETED: 11/18/83 DATE FORWARDED: 11/18/83

D030581 Volatile organic compounds not detected

J Hwang

D030582 - PCBs not detected

Chlorinated hydrocarbon pesticides not detected

Aliphatic hydrocarbons $C_{12} - C_{26}$ = 5 ug/g

LPC-8A 4/77 (NOT FOR DATA PROCESSING)

D0 30583 Rmc
D0 30584 Rmc

Time Collected: ________

Date Collected: 9-14-83

SPECIAL ANALYSIS FORM

Lab #

Date Received SEP 16 1983

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
DIVISION OF LAND/NOISE POLLUTION CONTROL

COUNTY:	FILE HEADING:	FILE NUMBER:
Cook		

SOURCE OF SAMPLE: (Exact Location)

Grid # 24 0.5 - 2.0 ft depth

Burnham Park

PHYSICAL OBSERVATIONS, REMARKS: soil sample

30583 - 3 Each THM vials

30584 - 2 Each 16oz clear Seal jar

TESTS REQUESTED:

COLLECTED BY: Doug Tolan TRANSPORTED BY: Sherry Otto

LABORATORY

RECEIVED BY: Rmc/ms DATE COMPLETED: 11/18/83 DATE FORWARDED: 11/18/83

D0 30583 Volatile organic compounds not detected

D0 30584 PCBs not detected

Chlorinated hydrocarbon pesticides not detected

Base-Neutral and Acid extractable compounds not detected

LPC-8A 4/77 (NOT FOR DATA PROCESSING)

Time Collected: ______

Date Collected: 9-14-83

SPECIAL ANALYSIS FORM

Lab # D030585 Rmc
D030586 Rmc

Date Received SEP 16 1983

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
DIVISION OF LAND/NOISE POLLUTION CONTROL

COUNTY:	FILE HEADING:	FILE NUMBER:
Cook		

SOURCE OF SAMPLE: (Exact Location)

Grid # 24 0° - 0.5 ft. depth
Burnham Park

PHYSICAL OBSERVATIONS, REMARKS: soil sample

TESTS REQUESTED:

COLLECTED BY: Doug Tolan TRANSPORTED BY: Sherry Otto

LABORATORY

RECEIVED BY: Rmc/ms DATE COMPLETED: 11/18/83 DATE FORWARDED: 11/18/83 D. Hurley

D030585 Volatile organic compounds not detected.

D030586 PCBs Not detected
Chlorinated hydrocarbon pesticides not detected
Base-Neutral and Acid extractable compounds not detected

LPC-8A 4/77 (NOT FOR DATA PROCESSING)

: Detection limits for pesticides + PCBs in water

Parameter	μg/l PPb	Parameter	μg/l
Lindane	<0.01	o,p' -DDE	<0.01
Heptachlor	<0.01	p,p' -DDE	<0.01
Aldrin	<0.01	o,p' -DDD	<0.01
Heptachlor Epoxide	<0.01	p,p' -DDD	<0.01
Alpha Chlordane	<0.01	o,p' -DDT	<0.01
Gamma Chlordane	<0.01	p,p' -DDT	<0.01
Dieldrin	<0.01	Toxaphene	<0.5
Endrin	<0.01	Silvex	
Methoxychlor	<0.05	2,4-D	
		PCBs	<0.1

Laboratory number

– IEPA Use Only –

...ted by: Date:

0030756

Time Collected: ____________

Date Collected: 9/28/83

SPECIAL ANALYSIS FORM

Lab # 0030757

Date Received

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
DIVISION OF LAND/NOISE POLLUTION CONTROL

COUNTY:	FILE HEADING:	FILE NUMBER:
Cook		

SOURCE OF SAMPLE: (Exact Location) Olive Harvey College
Grid #2

PHYSICAL OBSERVATIONS, REMARKS: 30756 1-gal H2O
↓ 57 3 each THM

TESTS REQUESTED: Organic Scan

COLLECTED BY: Sherry Otto TRANSPORTED BY: Danny Tolen

LABORATORY

RECEIVED BY: Rmc DATE COMPLETED: 12/12/83 DATE FORWARDED: 12/12/83 J Hurley

Chlorinated hydrocarbon pesticides Not detected
PCBs not detected (<0.1 ug/l)

Base-Neutral and Acid extractable compounds not detected (<5 ug/l)
except for Dibutyl phthalate = 63 ug/l

LPC-8A 4/77 (NOT FOR DATA PROCESSING)

0030756

0030757

DO 30757

	ug/l (ppb)		
methylene chloride	<1		
1,1-dichloroethane	<1		
dichloroethylene	<1		
chloroform	<1		
1,2-dichloroethane	<1		
1,1,1-trichloroethane	<1		
carbon tetrachloride	<1		
dichlorobromomethane	<1		
trichloroethylene	<1		
dibromochloromethane	<1		
bromoform	<1		
tetrachloroethylene	<1		
Benzene	5.	Possible but could not be positively identified	
Toluene	<5		
xylenes	<5		
ethylbenzene	<5		

Time Collected: ______ Lab # 30758 30759

Date Collected: 9/28/83 SPECIAL ANALYSIS FORM Date Received SEP 30 1983

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
DIVISION OF LAND/NOISE POLLUTION CONTROL

COUNTY:	FILE HEADING:	FILE NUMBER:
Cook		

SOURCE OF SAMPLE: (Exact Location) Luella Playground

Grid #3

PHYSICAL OBSERVATIONS, REMARKS: 30758 - 1 gal H2O

↓ 59 - 3 each THM

TESTS REQUESTED: Organic Scan

COLLECTED BY: [signature] TRANSPORTED BY: [signature]

LABORATORY

RECEIVED BY: Rmc DATE COMPLETED: 12/12/83 DATE FORWARDED: 12/12/83

chlorinated hydrocarbon pesticides not detected

PCBs not detected (< 0.1 ug/l)

Volatile organic compounds not detected (< 5 ug/l)

Base Neutral and Acid extractable compounds not detected (< 5 ug/l)

except Dibutyl phthalate = 6.9 ug/l

LPC-8A 4/77 (NOT FOR DATA PROCESSING) 30758 30759

D030759

	ug/1 (ppb)		
methylene chloride	<1		
1,1-dichloroethane	<1		
dichloroethylene	<1		
chloroform	<1		
1,2-dichloroethane	<1		
1,1,1-trichloroethane	<1		
carbon tetrachloride	<1		
dichlorobromomethane	<1		
trichloroethylene	<1		
dibromochloromethane	<1		
bromoform	<1		
tetrachloroethylene	<1		
Benzene	<5		
Toluene	<5		
Xylenes	<5		
Ethylbenzene	<5		

241

Time Collected: ______

Date Collected: 9/28/83

SPECIAL ANALYSIS FORM

Lab # 630760 630761

Date Received SEP 30 1983

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
DIVISION OF LAND/NOISE POLLUTION CONTROL

COUNTY: Cook | FILE HEADING: | FILE NUMBER:

SOURCE OF SAMPLE: (Exact Location) Veterans Mem. Park
Grid #4

PHYSICAL OBSERVATIONS, REMARKS: 30760 - 1 gal
61 - 3 THM

TESTS REQUESTED: organic scan

COLLECTED BY: [illegible] Otto TRANSPORTED BY: Doug [illegible]

LABORATORY

RECEIVED BY: lmc DATE COMPLETED: 12/12/83 DATE FORWARDED: 12/12/83

Chlorinated hydrocarbon pesticides not detected
PCBs not detected (<0.1 ug/l)
Volatile organic compounds not detected (<5 ug/l)
Base-Neutral and Acid extractable compounds not detected <5 ug/l
except for Dibutylphthalate 7.5 ug/l

[illegible]

LPC-8A 4/77 (NOT FOR DATA PROCESSING)

630760
630761

D030761

	ug/1 (ppb)		
methylene chloride	<1		
1,1-dichloroethane	<1		
dichloroethylene	<1		
chloroform	<1		
1,2-dichloroethane	<1		
1,1,1-trichloroethane	<1		
carbon tetrachloride	<1		
dichlorobromomethane	<1		
trichloroethylene	<1		
dibromochloromethane	<1		
bromoform	<1		
tetrachloroethylene	<1		
Benzene	<5		
Toluene	<5		
Xylenes	<5		
ethylbenzene	<5		

LP 41

Time Collected: ________ SPECIAL ANALYSIS FORM Lab # D030691

Date Collected: 9-21-83 Date Received SEP 22 1983

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
DIVISION OF LAND/NOISE POLLUTION CONTROL

COUNTY:	FILE HEADING:	FILE NUMBER:
COOK		

SOURCE OF SAMPLE: (Exact Location) CALUMET PARK
GRID #5

PHYSICAL OBSERVATIONS, REMARKS: NO ODOR; REMOVED SEVERAL VOLUMES

TESTS REQUESTED: ORGANICS SCAN

COLLECTED BY: SHERRY OTTO LPC TRANSPORTED BY: KEN BOSIE & DOUG TOLAN LPC

LABORATORY

RECEIVED BY: RM DATE COMPLETED: 11/18/83 DATE FORWARDED: 11/18/83

Volatile organic compounds not detected J. Hurley

PCBs not detected

Chlorinated hydrocarbon pesticides not detected

Base-Neutral and Acid extractable compounds not detected

LPC-8A 4/77 (NOT FOR DATA PROCESSING)

D030691

LP41

Time Collected: ______ SPECIAL ANALYSIS FORM Lab # DO 30693

Date Collected: 9-21-83 Date Received SEP 22 1983

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
DIVISION OF LAND/NOISE POLLUTION CONTROL

COUNTY:	FILE HEADING:	FILE NUMBER:
COOK		

SOURCE OF SAMPLE: (Exact Location) BRIGHT SCHOOL
GRID #8

PHYSICAL OBSERVATIONS, REMARKS: NO ODOR ; REMOVED
SEVERAL VOLUMES

TESTS REQUESTED: ORGANICS SCAN

COLLECTED BY: SHERRY OTTO LPC TRANSPORTED BY: KEN BOSLE & DOUG TOLAN LPC

LABORATORY

RECEIVED BY: DM DATE COMPLETED: 11/18/83 DATE FORWARDED: 11/18/83

Volatile organic compounds not detected GHurley
PCBs - not detected
chlorinated hydrocarbon pesticides not detected
Base-Neutral and Acid extractable compounds not detected

LPC-8A 4/77 (NOT FOR DATA PROCESSING)

~~DO30692~~
DO30693

LP 41

Time Collected: ______ Lab # D030695

SPECIAL ANALYSIS FORM

Date Collected: 9-21-83 Date Received [illegible]

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
DIVISION OF LAND/NOISE POLLUTION CONTROL

COUNTY:	FILE HEADING:	FILE NUMBER:
COOK		

SOURCE OF SAMPLE: (Exact Location) WOLFE PLAYGROUND PARK GRID # 9

PHYSICAL OBSERVATIONS, REMARKS: NO ODOR; REMOVED SEVERAL VOLUMES

TESTS REQUESTED: ORGANICS SCAN

COLLECTED BY: ~~SHERRY OTTO~~ TRANSPORTED BY: ~~DOUG TOLAN~~ KEN BOJWE ($) LPC

LABORATORY

RECEIVED BY: FM DATE COMPLETED: 11/18/83 DATE FORWARDED: 11/18/83

Volatile organic compounds not detected

PCBs Not detected

chlorinated hydrocarbon pesticides - not detected

Base-Neutral and Acid extractable compounds not detected.

[illegible signature]

LPC-8A 4/77 (NOT FOR DATA PROCESSING)

D030695

LP 41

Time Collected: ______ Lab # D030690

SPECIAL ANALYSIS FORM

Date Collected: 9-21-83 Date Received SEP 22 1983

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
DIVISION OF LAND/NOISE POLLUTION CONTROL

COUNTY:	FILE HEADING:	FILE NUMBER:
COOK		

SOURCE OF SAMPLE: (Exact Location) ADAMS ELEMENTARY PLAYGROUND GRID #10

PHYSICAL OBSERVATIONS, REMARKS: NO ODOR; REMOVED SEVERAL VOLUMES

TESTS REQUESTED: ORGANICS SCAN

COLLECTED BY: SHERRY OTTO LPC TRANSPORTED BY: KEN BOSIC { DOUG TOLAN LPC

LABORATORY

RECEIVED BY: RA DATE COMPLETED: 11/18/83 DATE FORWARDED: 11/18/83

Volatile organic compounds not detected (<5. ug/l - PPb) J Hurley

PCBs - Not detected (< 0.1 ug/l)

Chlorinated hydrocarbon pesticides not detected

Base-Neutral and Acid extractable compounds not detected (<5. ug/l)

LPC-8A 4/77 (NOT FOR DATA PROCESSING)

D030690

LPHI

0030753

0030753

Time Collected: ______ SPECIAL ANALYSIS FORM Lab #

Date Collected: 9/27/83 Date Received SEP 30 1983

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
DIVISION OF LAND/NOISE POLLUTION CONTROL

COUNTY:	FILE HEADING:	FILE NUMBER:
Cook		

SOURCE OF SAMPLE: (Exact Location) Chicago Port Dist.
Grid #12

PHYSICAL OBSERVATIONS, REMARKS: OVA indicated some organics present

30762 - 1 gal
63 - 3 THM

TESTS REQUESTED: organic scan

COLLECTED BY: S. Henry Otto TRANSPORTED BY: Dan Tolan

LABORATORY

RECEIVED BY: lme DATE COMPLETED: 12/12/83 DATE FORWARDED: 12/12/83

Chlorinated hydrocarbon pesticides not detected JHurley
PCBs not detected

Benzene = 580 ug/l
Toluene = 1700 ug/l
Xylenes = 560 ug/l
Ethylbenzene = 30 ug/l
Pyridine = 10 ug/l
Methylpyridine = 5 ug/l
C_3-Substituted benzenes = 40 ug/l
Naphthalene = 970 ug/l
Methylnaphthalene = 60 ug/l

Indene = 40 ug/l
Phenylethanone = 110 ug/l
Dimethylpyridine = 140. ug/l
Benzothiophene = 20 ug/l
Acenaphthalene = 20 ug/l
Dibutylphthalate = 1.3 ug/l
Unidentified compounds estimated to be approximately 35. ug/l Total

LPC-8A 4/77 (NOT FOR DATA PROCESSING)

0030753

0030752

D030763

	ug/l (ppb)		
methylene chloride	<1		
1,1-dichloroethane	<1		
dichloroethylene	<1		
chloroform	<1		
1,2-dichloroethane	<1		
1,1,1-trichloroethane	<1		
carbon tetrachloride	<1		
dichlorobromomethane	<1		
trichloroethylene	<1		
dibromochloromethane	<1		
bromoform	<1		
tetrachloroethylene	<1		
Benzene	580		
Toluene	1700		
Xylenes	560		
Ethylbenzene	30		
ridine	10		
Methylpyridine	5		

LP41

Time Collected: ______

Date Collected: 9/27/83

SPECIAL ANALYSIS FORM

Lab # C30734 C30735

Date Received SEP 30 1983

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
DIVISION OF LAND/NOISE POLLUTION CONTROL

COUNTY:	FILE HEADING:	FILE NUMBER:
Cook		

SOURCE OF SAMPLE: (Exact Location) Republic Steel
Grid #14

PHYSICAL OBSERVATIONS, REMARKS: OVA indicated organics
no odor

30764 – 1 gal
↓ 65 3 THM

TESTS REQUESTED: Organic Scan

COLLECTED BY: S[illegible] O[illegible] TRANSPORTED BY: D[illegible] T[illegible]

LABORATORY

RECEIVED BY: Rmc DATE COMPLETED: 12/12/83 DATE FORWARDED: 12/12/83

Chlorinated hydrocarbon pesticides not detected G Hurley
PCBs Not detected (< 0.1 ug/l)
Pyridine = 20 ug/l
Methyl pyridine = 15 ug/l
Dibutyl phthalate = 3.9 ug/l

LPC-8A 4/77 (NOT ~~FOR~~ DATA PROCESSING)

C30734
C30735

D030765

	ug/1 (ppb)		
methylene chloride	< 1		
1,1-dichloroethane	< 1		
dichloroethylene	< 1		
chloroform	< 1		
1,2-dichloroethane	< 1		
1,1,1-trichloroethane	< 1		
carbon tetrachloride	< 1		
dichlorobromomethane	< 1		
trichloroethylene	< 1		
dibromochloromethane	< 1		
bromoform	< 1		
tetrachloroethylene	< 1		
Benzene	5	Possible but could not be positively ~~identi~~ identified	
Toluene	< 5		
xylenes	< 5		
ethyl benzene	< 5		

LP4'

Time Collected: ______ Lab # 30756 / 30757

SPECIAL ANALYSIS FORM

Date Collected: 9/27/83 Date Received: Sep 30 1983

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
DIVISION OF LAND/NOISE POLLUTION CONTROL

COUNTY:	FILE HEADING:	FILE NUMBER:
Cook		

SOURCE OF SAMPLE: (Exact Location) New Canaan High School
Grid #16

PHYSICAL OBSERVATIONS, REMARKS: OVA indicated organics present
No odor

30766 - 1 gal
67 - 3 THM

TESTS REQUESTED: organic scan

COLLECTED BY: Sherry Otte TRANSPORTED BY: Doug Tolan

LABORATORY

RECEIVED BY: RMC DATE COMPLETED: 12/12/83 DATE FORWARDED: 12/12/83

Chlorinated hydrocarbon pesticides Not detected

PCBs Not detected (< 0.1 ug/l)

Volatile organic compounds not detected

Dibutylphthalate = 76 ug/l

Aliphatic hydrocarbons = 10 ug/l

J. Hurley

LPC-8A 4/77 (NOT FOR DATA PROCESSING)

30756
30757

D030767

	ug/1 (ppb)		
methylene chloride	<1		
1,1-dichloroethane	<1		
dichloroethylene	<1		
chloroform	<1		
1,2-dichloroethane	<1		
1,1,1-trichloroethane	<1		
carbon tetrachloride	<1		
dichlorobromomethane	<1		
trichloroethylene	<1		
dibromochloromethane	<1		
bromoform	<1		
tetrachloroethylene	<1		
Benzene	<5		
Toluene	<5		
Xylenes	<5		
Ethylbenzene	<5		

1281

Time Collected: ______ Lab # 030758 030759

SPECIAL ANALYSIS FORM

Date Collected: 9/26/83 Date Received SEP 30 1983

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
DIVISION OF LAND/NOISE POLLUTION CONTROL

COUNTY:	FILE HEADING:	FILE NUMBER:
Cook		

SOURCE OF SAMPLE: (Exact Location) Beaubien Forest Preserve Grid #17

PHYSICAL OBSERVATIONS, REMARKS: 30768 - 1gal
69 - 3 Am

TESTS REQUESTED: organic scan

COLLECTED BY: Sherry Otte TRANSPORTED BY: Doug Tolan

LABORATORY

RECEIVED BY: DMK DATE COMPLETED: 12/12/83 DATE FORWARDED: 12/12/83 J Huang

Chlorinated hydrocarbon pesticides not detected
PCBs not detected (0.1 ug/l)
Possible trace of pyridine & methyl pyridine <5 ug/l
Dibutyl phthalate = 15 ug/l

LPC-8A 4/77 (NOT FOR DATA PROCESSING) 030758 030759

D030769

	ug/1 (ppb)		
methylene chloride	<1		
1,1-dichloroethane	<1		
dichloroethylene	<1		
chloroform	<1		
1,2-dichloroethane	<1		
1,1,1-trichloroethane	<1		
carbon tetrachloride	<1		
dichlorobromomethane	<1		
trichloroethylene	<1		
dibromochloromethane	<1		
bromoform	<1		
tetrachloroethylene	<1		
Benzene	<5		
Toluene	<5		
Xylenes	<5		
Ethylbenzene	<5		

LP HI

Time Collected: ______ Lab # 30770 30771

SPECIAL ANALYSIS FORM

Date Collected: 9/27/83 Date Received ______

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
DIVISION OF LAND/NOISE POLLUTION CONTROL

COUNTY:	FILE HEADING:	FILE NUMBER:
Cook		

SOURCE OF SAMPLE: (Exact Location) Thomas O'Brien Lock + Dam Grid # 18

PHYSICAL OBSERVATIONS, REMARKS: O.V.A. indicated organics present

30770 - 1 gal
71 - 3 THM

TESTS REQUESTED: organic scan

COLLECTED BY: [illegible] TRANSPORTED BY: [illegible]

LABORATORY

RECEIVED BY: [illegible] DATE COMPLETED: 12/12/83 DATE FORWARDED: 12/12/83

Chlorinated hydrocarbon pesticides not detected
PCBs not detected (<0.1 ug/l)
Volatile organic compounds not detected (<5. ug/l)
Base-Neutral and Acid extractables not detected (<5. ug/l)
except for Dibutyl phthalate = 5. ug/l

LPC-8A 4/77 (NOT FOR DATA PROCESSING) 30770 30771

D030771

	ug/1 (ppb)		
methylene chloride	<1		
1,1-dichloroethane	<1		
dichloroethylene	<1		
chloroform	<1		
1,2-dichloroethane	<1		
1,1,1-trichloroethane	<1		
carbon tetrachloride	<1		
dichlorobromomethane	<1		
trichloroethylene	<1		
dibromochloromethane	<1		
bromoform	<1		
tetrachloroethylene	<1		
Benzene	<5		
Toluene	<5		
Xylenes	<5		
thylbenzene	<5		

LP41

Time Collected: ______ Lab # D030694

SPECIAL ANALYSIS FORM

Date Collected: 9-20-83 Date Received SEP 27 1983

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
DIVISION OF LAND/NOISE POLLUTION CONTROL

COUNTY: COOK	FILE HEADING:	FILE NUMBER:

SOURCE OF SAMPLE: (Exact Location) MANN PARK
GRID #19

PHYSICAL OBSERVATIONS, REMARKS: NO ODOR; REMOVED SEVERAL VOLUMES

TESTS REQUESTED: ORGANICS SCAN

COLLECTED BY: SHERRY OTTO LPC TRANSPORTED BY: KEN BOLIE & DOUG TOLAN LPC

LABORATORY

RECEIVED BY: RM DATE COMPLETED: 11/18/83 DATE FORWARDED: 11/18/83

Volatile organic compounds not detected J. Huney
PCBs - not detected
Chlorinated hydrocarbon pesticides not detected
Base-Neutral and Acid extractable compounds not detected

LPC-8A 4/77 (NOT FOR DATA PROCESSING)

D030694

LP 41

Time Collected: ____ Lab # D030692

Date Collected: 9-20-83 SPECIAL ANALYSIS FORM Date Received SEP 22 1983

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
DIVISION OF LAND/NOISE POLLUTION CONTROL

COUNTY:	FILE HEADING:	FILE NUMBER:
COOK		

SOURCE OF SAMPLE: (Exact Location) SOUTH PORTION OF WOLFE LAKE GRID # 20

PHYSICAL OBSERVATIONS, REMARKS: NO ODOR; SEVERAL VOLUMES REMOVED

TESTS REQUESTED: ORGANICS SCAN

COLLECTED BY: SHERRY OTTO LPC TRANSPORTED BY: KEN BOSIE & DOUG TOLAN LPC

LABORATORY

RECEIVED BY: RM DATE COMPLETED: 11/18/83 DATE FORWARDED: 11/18/83

Volatile organic compounds not detected JHurley

PCBs - Not detected

Chlorinated hydrocarbon pesticides not detected

Base-Neutral and Acid extractable compounds not detected

LPC-8A 4/77 (NOT FOR DATA PROCESSING)

D030692

030575

Time Collected: ____________ SPECIAL ANALYSIS FORM Lab # 030576

Date Collected: 9-14-83 Date Received SEP 16 1983

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
DIVISION OF LAND/NOISE POLLUTION CONTROL

COUNTY:	FILE HEADING:	FILE NUMBER:
Cook		

SOURCE OF SAMPLE: (Exact Location)

Grid # 22 H_2O sample

John W. Needles Park

PHYSICAL OBSERVATIONS, REMARKS: slow recharge, removed 1 volume on 9-13-83

30575 - 3 EACH THM VIALS

30576 - 1 GAL. WATER

TESTS REQUESTED:

COLLECTED BY: Sherry Otto TRANSPORTED BY: Sherry Otto

LABORATORY

RECEIVED BY: RMC/MS DATE COMPLETED: 11/18/83 DATE FORWARDED: 11/18/83

D030575 Volatile organic compounds not detected (<5. ug/l ppb)

D030576 PCBs not detected (<0.1 ug/l)

Chlorinated hydrocarbon pesticides not detected

Base-Neutral and Acid extractable compounds not detected (~~<0.2 ug/l~~) (<5. ug/l ppb)

LPC-8A 4/77 (NOT FOR DATA PROCESSING)

D030577
D030578
SEP 16 1983

Time Collected: ______ Lab #

SPECIAL ANALYSIS FORM

Date Collected: 9-14-83 Date Received ______

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
DIVISION OF LAND/NOISE POLLUTION CONTROL

COUNTY:	FILE HEADING:	FILE NUMBER:
Cook		

SOURCE OF SAMPLE: (Exact Location)

Grid # 24 H_2O sample

PHYSICAL OBSERVATIONS, REMARKS: removed several volumes before sampling, no odor

30577 - 3 EACH THM vials
30578 - 1 gal water

TESTS REQUESTED:

COLLECTED BY: Sherry Otto TRANSPORTED BY: Sherry Otto

LABORATORY

RECEIVED BY: Rmc/ms DATE COMPLETED: 11/18/83 DATE FORWARDED: 11/18/83

D030577 Volatile organic compounds not detected (< 5 ug/l ppb)

D030578 PCBs not detected < 0.1 ug/l
Chlorinated hydrocarbon pesticides not detected
Base-Neutral and acid extractable compounds not detected (< 5 ug/l)

LPC-8A 4/77 (NOT FOR DATA PROCESSING)

LPH

Time Collected: ______

Date Collected: 9/28/83

SPECIAL ANALYSIS FORM

Lab # 030772 030773

Date Received SEP 30 1983

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
DIVISION OF LAND/NOISE POLLUTION CONTROL

COUNTY:	FILE HEADING:	FILE NUMBER:
Cook		

SOURCE OF SAMPLE: (Exact Location) Burnham Woods Golf Course Grid #25

PHYSICAL OBSERVATIONS, REMARKS:

30772 – 1 gal
– 73 – 3 THM

TESTS REQUESTED: organic scan

COLLECTED BY: Sherry Otto TRANSPORTED BY: Dan Tolan

LABORATORY

RECEIVED BY: Rmc DATE COMPLETED: 12/12/83 DATE FORWARDED: 12/12/83

J Hurley

Chlorinated hydrocarbon pesticides not detected
PCBs not detected (<0.1 ug/l)
Volatile organic compounds not detected (<5. ug/l)
Base-Neutral and Acid extractable compounds not detected (<5. ug/l)

LPC-8A 4/77 (NOT FOR DATA PROCESSING) 030772 030773

D030773

	ug/1 (ppb)		
methylene chloride	<1		
1,1-dichloroethane	<1		
dichloroethylene	<1		
chloroform	<1		
1,2-dichloroethane	<1		
1,1,1-trichloroethane	<1		
carbon tetrachloride	<1		
dichlorobromomethane	<1		
trichloroethylene	<1		
dibromochloromethane	<1		
bromoform	<1		
tetrachloroethylene	<1		
Benzene	<5		
Toluene	<5		
Xylenes	<5		
Ethylbenzene	<5		

DO 30776 Blank

	ug/1 (ppb)		
methylene chloride	<1		
1,1-dichloroethane	<1		
dichloroethylene	<1		
chloroform	<1		
1,2-dichloroethane	<1		
1,1,1-trichloroethane	<1		
carbon tetrachloride	<1		
dichlorobromomethane	<1		
trichloroethylene	<1		
dibromochloromethane	<1		
bromoform	<1		
tetrachloroethylene	<1		
Benzene	<5		
Toluene	<5		
Xylenes	<5		
Ethylbenzene	<5		

APPENDIX C

INTRODUCTION TO BORING LOGS

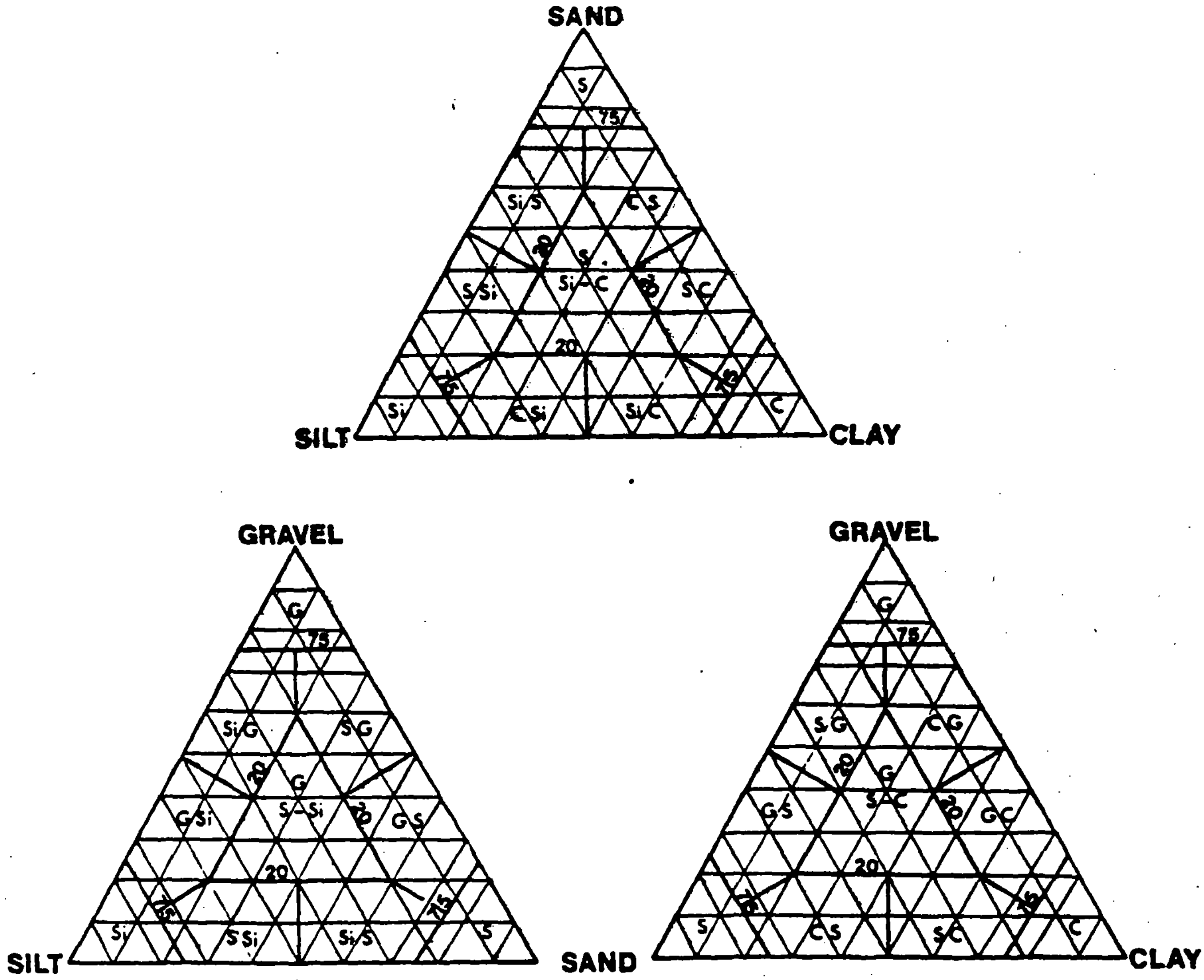
The IEPA borings show a good representation of the Recent and Wisconsin age deposits of this area. Recent man made deposits, described on the logs as fill material, were found in ten of the twenty two holes drilled and ranged from one to eleven feet thick. The thickest and major deposit of this type was slag found in the area around the steel factorys and Lake Calumet. Other types of fill found included concrete, cinders, bricks and soil fill.

Sediment deposited during the various stages of Lake Chicago is indicated by the sand, silt, and clay deposits on the boring logs. Many of the logs also show a till, which is the material deposited by the Wisconsin age glaciers prior to Lake Chicago.

It is difficult to say what the elevation of the water table was at the time these holes were drilled due to the fact that ground elevations were not surveyed. However, the depth to water encountered in the borings varied from two to ten feet with two holes dry at ten foot completion depth, one at 15 and another at 25. Water depth is indicated on the logs by this ▼ sign.

Samples were obtained with a five foot continuous sampler indicated on the logs by the initials CS. At grid #14 the nature of the material required a change in sampler and at this hole a split spoon sampler was used. This is shown on the boring logs by the initials SS. The samples were removed from the sampler at the site and split lengthwise. A composite sample was then taken from the center of the core. Sampling intervals are indicated on the logs by S_1, S_2 and S_3. Sample recovery is the amount of sample actually retained in the sampler.

SO:mks:16/71



Percent grain size	Adjective modifiers for minor grain sizes*
>15%	Included in major textural class
10-15%	Some
5-10%	Little
< 5%	Trace

*Only applicable to wells bored by the IEPA

Textural triangles (adopted from Shepard, 1954) and terminology used for classification of unconsolidated deposits.

Illinois Environmental Protection Agency

BORING NO. Grid # 1 | WELL NO. – | GROUNDLEVEL ELEV – | PAGE 1 OF 2

COUNTY Cook | SITE NO –

SITE Chicago State University

BORING LOCATION See site sketch

DRILLING EQUIPMENT CME 55 | SIZE 3¼ inch I.D. | TYPE hollow stem auger

COMPLETION DEPTH 25 feet | BEDROCK DEPTH – | TOP OF CASING –

DATE START	DATE FINISH	TIME START	TIME FINISH
9/22/83	9/22/83	10:10A.	11:30A.

ANNULUS FILL MATERIAL: ABOVE PACKING / PACKING / SCREEN

WELL CASING TYPE AND QUANTITY: No well installed; backfill with cuttings at completion

SCREEN INTERVAL TYPE AND QUANTITY:

PERSONNEL: L. Sherry Otto; D. Ken Bosie; H. Enrique Gonzalez

ELEV	DESCRIPTION	DEPTH	Sample No	Sampler Type	Sample Recovery Ft	Penetrometer (Strength)	N Value (Blows)	REMARKS
	0.0-1.0 Black Silt roots abundant, dry	0	S_1					No odor and no indication on OVA (organic vapor analysor).
	1.0-3.0 Black Fill Material cinders, dry	1	S_2					
		2		CS	5.0			
	3.0-5.0 Brown gray silty Clay till little pebbles (5%) dry	3–4						
	5.0-10.0 Gray-brown silty Clay till mottled, trace of peebles and roots, more gray from 8.0-10.0ft dry	5–6	S_3					No odor and no indication on OVA.
		7		CS	5.0			
		8–9						
	10.0-15.0 Gray-brown silty Clay till mottled, trace of pebbles, dry	10–11						No odor
		12		CS				
		13–14						

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BORING NO Grid #1	WELL NO.	GROUNDLEVEL ELEV.	PAGE 2 OF 2
COUNTY Cook	SITE NO.	DATE START / FINISH	ANNULUS FILL MATERIAL ABOVE PACKING
SITE Chicago State University			
BORING LOCATION		TIME START / FINISH	PACKING
DRILLING EQUIPMENT	SIZE	TYPE	
COMPLETION DEPTH	BEDROCK DEPTH	TOP OF CASING	SCREEN
WELL CASING	TYPE AND QUANTITY	SAMPLES	PERSONNEL L. D. R.
SCREEN INTERVAL	TYPE AND QUANTITY		

ELEV	DESCRIPTION	DEPTH	Sample No.	Sampler Type	Sample Recovery Ft.	Penetrometer (Strength)	N Value (Blows)	REMARKS
	15.0-20.0 Gray silty Clay till, dry	15-20		CS				No odor
	20.0-25.0 Same as above, dry	20-25		CS				No odor
	Boring complete Dry hole at completion Samples S_1, S_2, and S_3 taken for metals only	25						

Illinois Environmental Protection Agency

BORING NO	Grid #2
WELL NO.	—
GROUNDLEVEL ELEV.	—
PAGE	1 OF 2
COUNTY	Cook
SITE NO	—
SITE	Olive Harvey College
BORING LOCATION	See site sketch
DRILLING EQUIPMENT	CME 55
SIZE	3¼ inch I.D.
TYPE	hollow stem auger
DATE START	9/22/83
DATE FINISH	9/22/83
TIME START	8:00A.
TIME FINISH	9:35A.
ANNULUS FILL MATERIAL: ABOVE PACKING	
PACKING	
SCREEN	
COMPLETION DEPTH	20 feet
BEDROCK DEPTH	—
TOP OF CASING	—
WELL CASING TYPE AND QUANTITY	No well installed; backfilled with cuttings 9-28-83
SCREEN INTERVAL TYPE AND QUANTITY	
PERSONNEL	L. Sherry Otto; D. Ken Bosie; H. Enrique Gonzalez

ELEV.	DESCRIPTION	DEPTH	Sample No	Sampler Type	Sample Recovery Ft	Penetrometer (Strength)	N Value (Blows)	REMARKS
	0.0 - 0.9 Black clayey Silt, many roots	0	S_1					No odor and no indication on OVA.
	0.9 - 4.2 Dark brown silty sandy Fill Material, some pebbles, sand ranging from very fine to fine grain, dry	1–2	S_2	CS	5.0			
	4.2 - 4.6 Dark gray silty clayey Fill Material trace of pebbles, dry	4						
	4.6 - 5.0 Dark brown silty sand Fill Material, some pebbles, very fine to fine grained sand, dry	5	S_3	CS	5.0			No odor and no indication on OVA.
	5.0 - 8.8 Sandy silty Fill Material, some pebbles	6–8						
	8.8 - 9.5 Black sandy Silt organic, trace of roots, moist	9						
	9.5 - 10.0 Brown Sand fine to medium grain, wet	10						
	10.0 - 15.0 Brown - gray clayey Silt till, little pebbles (5%), moist	10–14		CS				No odor

IL 532-1112

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BORING NO Grid #2	WELL NO	GROUNDLEVEL ELEV.	PAGE 2 OF 2
COUNTY Cook	SITE NO	DATE START / FINISH	ANNULUS FILL MATERIAL ABOVE PACKING
SITE Olive Harvey College			
BORING LOCATION		TIME START / FINISH	PACKING
DRILLING EQUIPMENT	SIZE	TYPE	
COMPLETION DEPTH	BEDROCK DEPTH	TOP OF CASING	SCREEN
WELL CASING	TYPE AND QUANTITY	SAMPLES	PERSONNEL L- D- N-
SCREEN INTERVAL	TYPE AND QUANTITY		

ELEV	DESCRIPTION	DEPTH	Sample No.	Sampler Type	Sample Recovery Ft.	Penetrometer (Strength)	N Value (Blows)	REMARKS
		14						
	15.0 - 20.0 Dark gray silty Clay till, very hard, moist	15–20		CS				No odor
	Boring complete 9-28-83 Groundwater level measured 10.0 feet from surface Water samples for metals and oranics taken Samples S_1, S_2 and S_3 taken for metals only	20						

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BORING NO. Grid #3 | WELL NO. – | GROUNDLEVEL ELEV – | PAGE 1 OF 1

COUNTY Cook | SITE NO.

DATE: START 9/28/83 FINISH 9/28/83

TIME: START 9:00A. FINISH 10:00A.

SITE Luella Playground School

BORING LOCATION See site sketch

DRILLING EQUIPMENT CME 55 | SIZE 3¼ inch I.D. | TYPE hollow stem augers

COMPLETION DEPTH 15 feet | BEDROCK DEPTH – | TOP OF CASING –

ANNULUS FILL MATERIAL: ABOVE PACKING | PACKING | SCREEN

WELL CASING TYPE AND QUANTITY No well installed; backfilled with cuttings after sampling.

SCREEN INTERVAL TYPE AND QUANTITY

PERSONNEL: L. Sherry Otto; D. Doug Tolan; H. Ken Bosie

ELEV.	DESCRIPTION	DEPTH	Sample No.	Sampler Type	Sample Recovery Ft	Penetrometer (Strength)	N Value (Blows)	REMARKS
	0.0-0.6 Black sandy Silt, roots, dry	0	S_1					No indication on OVA at bole hole or sample.
	0.6-2.0 Blue Fill Material crystalline, very hard, dry	1	S_2					
	2.0-3.8 Light brown Sand fine to medium grain, moist	2		CS	3.8			
		3						
	▼	4						
	5.0-5.7 Same as above	5						No indication on OVA at bore hole or sample.
	5.7-6.4 Gray Sand, medium grain, black streaks along bedding planes	6	S_3					
	6.4-7.1 Dark gray Clay trace of pebbles							
	7.1-8.0 Dark gray sandy Silt	7		CS	3.0			
		8						
		9						
	10.0-15.0 Gray Clay till	10		CS				
		15						

Boring complete

Groundwater level at completion was 9.7 feet from surface.

Bailed well dry.

Water samples taken for metals and organics.

Samples S_1, S_2, and S_3 taken for metals only.

Illinois Environmental Protection Agency

BORING NO. Grid # 4	WELL NO. –	GROUNDLEVEL ELEV. –	PAGE 1 OF 1
COUNTY Cook	SITE NO		

	DATE		TIME		ANNULUS FILL MATERIAL
SITE Veterans Memorial Park	START 9/28/83	FINISH 9/28/83	START 10:30A	FINISH 11:00A	ABOVE PACKING
BORING LOCATION See site sketch					PACKING
DRILLING EQUIPMENT CME 55 SIZE 3¼ inch I.D. TYPE hollow stem auger					SCREEN
COMPLETION DEPTH 10 feet / BEDROCK DEPTH – / TOP OF CASING –					

WELL CASING TYPE AND QUANTITY: No well installed; backfilled hole with cuttings at completion

SCREEN INTERVAL TYPE AND QUANTITY:

PERSONNEL:
L. Sherry Otto
D. Ken Bosie
H. Enrique Gonzalez

ELEV	DESCRIPTION	DEPTH	Sample No	Sampler Type	Sample Recovery Ft.	Penetrometer (Strength)	N Value (Blows)	REMARKS
	0.0-0.5 Black sandy Silt roots	0	S_1					No indication on OVA at bore hole or sample
	0.5-1.2 Brown with black mottling, Sand, medium grained	1	S_2					
	1.2-1.5 Black clayey Silt							
	1.5-1.7 Gray sandy Clay trace of pebbles	2						
	1.7-2.4 Brown Sand medium grained ▼			CS	4.0			
	2.4-2.6 Brown Sand coarse to very coarse grained	3						
	2.6-4.0 Brown Sand fine grained, wet	4						
	5.0-6.3 Same as above	5						No indication on OVA at bore hole or sample
	6.3-7.8 Gray Sand fine grained, very wet	6	S_3					
		7		CS	2.8			
		8						
		9						
	Boring complete	10						

Groundwater level was 3.3 feet from surface at completion.
Bailed several volumes prior to sampling.
Took water samples for metals and organics.
Samples S_1, S_2 and S_3 taken for metals only.

Illinois Environmental Protection Agency

BORING NO.	Grid #5
WELL NO	–
GROUNDLEVEL ELEV.	–
PAGE	1 OF 1
COUNTY	Cook
SITE NO	
SITE	Calumet Park
BORING LOCATION	See site sketch
DRILLING EQUIPMENT / SIZE / TYPE	CME 55 3¼ inch I.D. hollow stem auger
COMPLETION DEPTH	10 feet
BEDROCK DEPTH	–
TOP OF CASING	–
DATE START	9/21/83
DATE FINISH	9/21/83
TIME START	3:15P
TIME FINISH	4:00P
ANNULUS FILL MATERIAL: ABOVE PACKING	
PACKING	
SCREEN	
WELL CASING TYPE AND QUANTITY	No well installed; backfilled hole with cuttings at completion
SCREEN INTERVAL TYPE AND QUANTITY	
PERSONNEL	L. Sherry Otto; D. Ken Bosie; H. Enrique Gonzalez

ELEV	DESCRIPTION	DEPTH	Sample No	Sampler Type	Sample Recovery ft	Penetrometer (Strength)	N Value (Blows)	REMARKS
	0.0-0.9 Black Silt roots abundant	0	S_1					No indication on OVA at bole hole or sample
	0.9-2.7 Light to medium brown Sand medium grained, some orange staining, trace roots	1	S_2	CS	2.7			
	5.0-8.0 Light brown Sand coarse to very coarse, wet	5	S_3	CS	5.0			No indication on OVA at bore hole or sample.
	8.0-10.0 Gray Sand fine to medium grained, wet	8						
	Boring complete	10						

Groundwater level was 5.0 from surface at completion.
Removed several volumes prior to sampling.
Water samples taken for metals and organics.
Samples S_1, S_2, S_3 taken for metals

Illinois Environmental Protection Agency

BORING NO	Grid #6
WELL NO.	–
GROUNDLEVEL ELEV.	–
PAGE / OF	1 / 1
COUNTY	Cook
SITE NO	
SITE	Pullman Park
BORING LOCATION	See site sketch
DRILLING EQUIPMENT	CME 55
SIZE	3¼ inch
TYPE	I.D. hollow stem auger
COMPLETION DEPTH	15 ft.
BEDROCK DEPTH	–
TOP OF CASING	–
DATE START	9/29/83
DATE FINISH	9/29/83
TIME START	7:30 A.
TIME FINISH	8:30 A.
ANNULUS FILL MATERIAL: ABOVE PACKING / PACKING / SCREEN	
WELL CASING — TYPE AND QUANTITY	No well installed; backfilled hole with cuttings at completion.
SCREEN INTERVAL — TYPE AND QUANTITY	
PERSONNEL	L. Sherry Otto; D. Ken Bosie; H. Enrique Gonzalez

ELEV.	DESCRIPTION	DEPTH	Sample No.	Sampler Type	Sample Recovery Ft	Penetrometer (Strength)	N Value (Blows)	REMARKS
	0.0-0.7 Black Silt roots	0	S_1					No odor and no indication on OVA
	0.7-2.4 Gravelly Fill Material, blue cinders	1	S_2					
	2.4-2.7 Brown gray Clay, dry	2		CS	2.7			
	5.0-8.6 Brown gray Clay mottled with trace of pebbles, dry	5	S_3	CS	3.6			No odor and no indication on OVA
	10.0-15.0 Gray Clay, dry	10		CS	5.0			
		15						

Boring complete

Dry hole at completion.

Samples S_1, S_2, and S_3 ~~taken~~ for metals only.

Illinois Environmental Protection Agency

BORING NO. Grid #8	WELL NO. —	GROUNDLEVEL ELEV. —	PAGE 1 OF 1
COUNTY Cook	SITE NO		

SITE: Bright School

BORING LOCATION: See site sketch

DRILLING EQUIPMENT: CME 55 SIZE: 3¼ inch I.D. TYPE: hollow stem auger

COMPLETION DEPTH: 15 feet BEDROCK DEPTH: — TOP OF CASING: —

DATE: START 9/21/83 FINISH 9/21/83

TIME: START 1:30 P. FINISH 3:00 P.

ANNULUS FILL MATERIAL: ABOVE PACKING / PACKING / SCREEN

WELL CASING TYPE AND QUANTITY: No well installed; backfilled hole with cuttings after sampling

SCREEN INTERVAL TYPE AND QUANTITY:

PERSONNEL:
L. Sherry Otto
D. Ken Bosie
H. Enrique Gonzalez

ELEV.	DESCRIPTION	DEPTH	Sample No	Sampler Type	Sample Recovery Ft.	Penetrometer (Strength)	N Value Blows	REMARKS
	0.0 - 0.7 Black sandy Silt trace of pebbles, many roots	0	S_1					No odor and no indication on OVA at bore hole or sample.
	0.7 - 3.1 Light brown Sand coarse to very coarse grained	1	S_2					
		2		CS	4.0			
	3.1 - 3.2 Black silty Sand	3						
	3.2 - 4.0 Light brown Sand medium grain, moist	4						
	5.0 - 10.0 Brown Sand medium grain, some orange staining, some back streaks along bedding planes, moist, wet at 9.0 feet	5	S_3					No odor and no indication on OVA at bore hole or sample.
		7		CS				
		9 ▼						
		10		CS				
		15						

Boring complete

Groundwater level was 4.7 feet from surface

Bailed several volumes and took water samples for metals and organics.

Samples S_1, S_2 and S_3 were taken for metals only.

Illinois Environmental Protection Agency

BORING NO. Grid #9 WELL NO. – GROUND LEVEL ELEV. – PAGE 1 OF 1

COUNTY Cook SITE NO.

SITE Wolfe Playground Park

BORING LOCATION See site sketch

DRILLING EQUIPMENT CME 55 SIZE 3¼ inch I.D. TYPE hollow stem auger

COMPLETION DEPTH 10 feet BEDROCK DEPTH – TOP OF CASING –

DATE: START 9/21/83 FINISH 9/21/83

TIME: START 8:00A. FINISH 9:00A.

ANNULUS FILL MATERIAL: ABOVE PACKING / PACKING / SCREEN

WELL CASING TYPE AND QUANTITY No well installed; backfilled with cuttings after sampling

SCREEN INTERVAL TYPE AND QUANTITY

PERSONNEL: L. Sherry Otto, D. Ken Bosie, H. Erique Gonzalez

ELEV	DESCRIPTION	DEPTH	Sample No	Sampler Type	Sample Recovery ft	Penetrometer (Strength)	N Value (Blows)	REMARKS
	0.0 - 0.6 Black Silt roots	0	S_1					No odor and no indication on OVA at bore hole. or sample
	0.6 - 1.0 Light brown Sand very fine to fine grain, trace orange staining, trace roots	1	S_2					
	1.0 - 1.5 Black sandy Silt some roots., moist	2						
	1.5 - 2.8 Light brown Sand medium to coarse grain (1.7 - 1.9 coarse to very coarse grain) wet	3		CS	2.8			
		4						
	5.0-7.5 Light brown Sand medium grain	5						Same as above
		6	S_3	CS	1.0			
		7						
	7.5-10.0 Same as above	8						Same as above
		9		CS	2.0			
		10						

Boring complete

Groundwater level was 2.5 feet from surface.

Bailed several volumes and retrieved water samples for metals and organics

Samples S_1, S_2, and S_3 taken for metals only.

Illinois Environmental Protection Agency

BORING NO.	WELL NO.	GROUNDLEVEL ELEV.	PAGE	OF
Grid #10	–	–	1	1

COUNTY	Cook
SITE NO	
SITE	Adams Elementary School Playground
BORING LOCATION	See site sketch
DRILLING EQUIPMENT / SIZE / TYPE	CME 55 3 1/4 inch I.D. hollow stem auger
COMPLETION DEPTH	15 feet
BEDROCK DEPTH	–
TOP OF CASING	–
DATE START	9/21/83
DATE FINISH	9/21/83
TIME START	10:00A.
TIME FINISH	11:00 A.
ANNULUS FILL MATERIAL: ABOVE PACKING	
PACKING	
SCREEN	
WELL CASING / TYPE AND QUANTITY	No well installed; backfilled with cuttings after sampling
SCREEN INTERVAL / TYPE AND QUANTITY	

PERSONNEL:
L. Sherry Otto
D. Ken Bosie
H. Enrique Gonzalez

ELEV	DESCRIPTION	DEPTH	Sample No.	Sampler Type	Sample Recovery Ft.	Penetrometer (Strength)	N Value (Blows)	REMARKS
	0.0-0.4 Black clayey Silt, roots abundant	0	S_1					No odor and no indication on OVA at bore hole or sample.
	0.4-2.5 Sandy gravelly Fill Material with chunk of concrete @ 2.5 feet	1	S_2	CS	2.5			
	2.5-5.0 Fill Material	2–4		CS	0.5			Same as above
	5.0-6.0 Fill Material	5						Same as above
	6.0-10.0 Light brown Sand medium to coarse grain, some pebbles, wet	6 ▼	S_3	CS	3.2			
	10.0-15.0 Augered through for water sampling.	10 → 15						

Boring complete
Groundwater level at completion was 6.5 feet from surface.
Removed several volumes prior to sampling.
Water samples taken for metals and organics.
Samples S_1, S_2, and S_3 taken for metals only.

IL 532-1112

Illinois Environmental Protection Agency

BORING NO. Grid #12	WELL NO –	GROUNDLEVEL ELEV. –	PAGE 1 OF 1
COUNTY Cook	SITE NO –		
SITE Chicago Port District	DATE START 9/27/83	DATE FINISH 9/27/83	ANNULUS FILL MATERIAL ABOVE PACKING
BORING LOCATION See site sketch			PACKING
DRILLING EQUIPMENT CME 55 / SIZE 3 1/4 inch I.D. / TYPE hollow stem auger	TIME START 10:10 A.	TIME FINISH 12:00	
COMPLETION DEPTH 10.5 Feet / BEDROCK DEPTH – / TOP OF CASING –			SCREEN

WELL CASING / TYPE AND QUANTITY: No well installed; backfilled hole with cuttings after sampling.

SCREEN INTERVAL / TYPE AND QUANTITY:

PERSONNEL:
L. Sherry Otto
D. Ken Basie
H. Enrique Gonzalez

ELEV	DESCRIPTION	DEPTH	Sample No	Sampler Type	Sample Recovery Ft	Penetrometer (Strength)	N Value (Blows)	REMARKS
	0.0-5.0 Slag Fill Material (very difficult to drill)	0–5						OVA at bore hole 80-90 ppm. Could not use SS or CS because of the type of fill material. No sediment samples taken.
	5.0-10.5 Same as above	5–10.5						

Boring complete

Groundwater level at completion ~~was~~ 8.5 feet from surface.

Bailed well dry; later that day took water samples for metals and organics.

Illinois Environmental Protection Agency

BORING NO.	Grid #14
WELL NO.	–
GROUNDLEVEL ELEV.	–
PAGE / OF	1 / 1
COUNTY	Cook
SITE NO.	–
SITE	Republic Steel
BORING LOCATION	See site sketch
DRILLING EQUIPMENT / SIZE / TYPE	CME 55 3¼ inch I.D. hollow stem auger
COMPLETION DEPTH	9.5
BEDROCK DEPTH	–
TOP OF CASING	–
DATE START	9/27/83
DATE FINISH	9/27/83
TIME START	8:00A.
TIME FINISH	9:30A.
ANNULUS FILL MATERIAL: ABOVE PACKING	
PACKING	–
SCREEN	–
WELL CASING TYPE AND QUANTITY	No well installed; backfilled with cuttings after sampling.
SCREEN INTERVAL TYPE AND QUANTITY	
PERSONNEL	L. Sherry Otto; D. Ken Basie; H. Enrique Gonzalez

ELEV.	DESCRIPTION	DEPTH	Sample No.	Sampler Type	Sample Recovery Ft	Penetrometer (Strength)	N Value (Blows)	REMARKS
	0.0 - 2.5 Black Slag Fill Material	0 – 2	S_1	CS	2.0			OVA reading at bore hole was ~~40-60ppm~~. No reading on the sample.
	2.5 - 5.0 Augered through slag	2.5 – 5						OVA reading at bore hole was 100 ppm.
	5.0 - 5.2 Black Sand medium to coarse grain, wet 5.2 - 6.5 Light gray Sand medium grain, wet 6.5 - 8.0 Light gray to brown Sand medium grain, wet	5 – 6.5	S_2	SS	1.5		11 / 15	OVA reading of 10 ppm of sand sample.
		6.5 – 8		SS	1.5		10 / 13	5 ppm. OVA reading at bore hole. (S_3 for metals only)
	8.0 - 8.8 Light gray Sand medium to coarse grain 8.8 - 9.5 Light gray Sand fine to medium grain	8 – 9.5	S_3	SS	1.5		8 / 10	No reading on OVA (S_3 for metals only)

Boring complete

Groundwater level upon completion was 1.5 feet from surface.

Removed several volumes prior to sampling.

Water samples taken for metals and organics.

Samples S_1, S_2, S_3 taken for metals
S_2 taken for organics

Illinois Environmental Protection Agency

BORING NO.	WELL NO.	GROUNDLEVEL ELEV.	PAGE OF
Grid #15	–	–	1 / 1

COUNTY	SITE NO.
Cook	–

SITE: Wolf Lake Conservation Area

BORING LOCATION: See site sketch

DRILLING EQUIPMENT / SIZE / TYPE: CME 55 3¼ inch I.D. hollow stem auger

COMPLETION DEPTH	BEDROCK DEPTH	TOP OF CASING
10 feet	–	–

DATE START	DATE FINISH	TIME START	TIME FINISH
9/14/83	9/14/83	2:30P.	3:30P.

ANNULUS FILL MATERIAL: ABOVE PACKING / PACKING / SCREEN

WELL CASING TYPE AND QUANTITY: No well installed; backfilled with cuttings at completion.

SCREEN INTERVAL TYPE AND QUANTITY:

PERSONNEL:
L. Sherry Otto
D. Ken Bosie
H. Enrique Gonzalez

ELEV	DESCRIPTION	DEPTH	Sample No.	Sampler Type	Sample Recovery Ft.	Penetrometer (Strength)	N Value (Blows)	REMARKS
	0.0-0.4 Black Silt, some roots, dry	0	S_1	CS				No odor; OVA not operative
	0.4-1.5 Augered through, no sample	1						
	1.5-3.8 Fill Material black foundary sand and gravel, dry	2						No odor
		3	S_2	CS	2.3			
		4						
	5.0-8.5 Same as above	5						No odor
		6						
		7	S_3	CS				
		8						
	8.5-10.0 Augered through; no sample	9						
		10						

Boring complete

Dry hole at completion.

No water samples taken.

Samples S_1 and S_2 taken for metals and organics.

Sample S_3 taken for metals only.

Illinois Environmental Protection Agency

BORING NO.	Grid #16
WELL NO.	–
GROUNDLEVEL ELEV.	–
PAGE	1 OF 1
COUNTY	Cook
SITE NO	–
SITE	New Carver High School
BORING LOCATION	See site sketch
DRILLING EQUIPMENT	CME 55
SIZE	3¼ inch I.D.
TYPE	hollow stem auger
COMPLETION DEPTH	27.5
BEDROCK DEPTH	–
TOP OF CASING	–
DATE START	9/27/83
DATE FINISH	9/27/83
TIME START	2:20 P.
TIME FINISH	4:00 P.
ANNULUS FILL MATERIAL: ABOVE PACKING	
PACKING	
SCREEN	
WELL CASING TYPE AND QUANTITY	No well installed; backfilled hole with cuttings after sampling.
SCREEN INTERVAL TYPE AND QUANTITY	
PERSONNEL	L. Sherry Otto; D. Ken Bosie; H. Enrique Gonzalez

ELEV.	DESCRIPTION	DEPTH	Sample No	Sampler Type	Sample Recovery Ft	Penetrometer (Strength)	N Value (Blows)	REMARKS
	0.0-0.6 Black clayey Silt	0	S_1					OVA reading at bore hole is 30-40 ppm. No indication on sample.
	0.6-5.0 Fill Material, demo, bricks, glass from 3.0 ft. to 5.0 ft. with clay mixed throughout, dry	1	S_2	CS	5.0			
	5.0-7.7 Dark brown gray silty Sand fine to medium grain, shell fragments, trace roots, moist	5	S_3	CS	4.2	0.75		No indication with OVA
	7.7-9.2 Light gray Clay with orange yellow staining, trace roots, moist	7.7						
	10.0-27.5 Gray Clay hard	10–27		CS				Encountered water at 20 feet.

Boring complete

Groundwater level at completion was 20 feet from surface.

9-28-83 ground water level was 4.5 feet from surface.

Water samples taken for metals and organics.

Samples S_1, S_2 and S_3 taken for metals.

IL 532-1112
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BORING NO Grid #17	WELL NO. -	GROUNDLEVEL ELEV -	PAGE 1 OF 1
COUNTY Cook	SITE NO -		
SITE Beaubien Forest Preserve			
BORING LOCATION See site sketch			
DRILLING EQUIPMENT CME 55	SIZE 3¼ inch	TYPE I.D. hollow stem auger	
COMPLETION DEPTH 10 feet	BEDROCK DEPTH -	TOP OF CASING -	

DATE START	DATE FINISH	TIME START	TIME FINISH
9/26/83	9/26/83	3:30P.	5:00P.

ANNULUS FILL MATERIAL: ABOVE PACKING / PACKING / SCREEN

WELL CASING TYPE AND QUANTITY: No well installed; backfilled well with cuttings after sampling.

SCREEN INTERVAL TYPE AND QUANTITY:

PERSONNEL: L. Sherry Otto; D. Ken Basie; H. Enrique Gonzalez

ELEV	DESCRIPTION	DEPTH	Sample No.	Sampler Type	Sample Recovery Ft.	Penetrometer (Strength)	N Value (Blows)	REMARKS
	0.0-0.6 Black silty Sand, roots abundant	0	S_1					No odors and no detection with OVA
	0.6-1.5 Brown Sand medium to very coarse grain, some roots	1	S_2					
	1.5-2.8 Brown gravelly Sand medium to coarse grain sand, pebbles range in size from 5-40 mm., subangular to angular, trace roots	2		CS	2.8			
	5.0-6.0 Brown Sand medium to very coarse grain, gravelly zone at 5.4 5.5 pebbles range in size of 5 to 20mm, wet	5	S_3					No odors and no detection with OVA
	6.0-7.0 Brown sandy Gravel, 0 to 5mm in size, trace shell fragments, angular, wet	6						
	7.0-7.2 Brown Sand very fine to fine grain shells unbroken), wet	7		CS	3.1			
	7.2-8.3 Gray silty Sand very fine grain, trace roots, trace shell fragments	8						
	Boring complete Groundwater level at completion was 6.8 feet from surface. Bailed well dry eventhough good recharge. Water samples taken for metals and organics. Samples S_1, S_2, and S_3 taken for metals.	10						

Illinois Environmental Protection Agency

BORING NO	Grid #18
WELL NO.	–
GROUNDLEVEL ELEV	–
PAGE	1 OF 1
COUNTY	Cook
SITE NO.	
SITE	Thomas J. O'Brien Lock and Dam
DATE START	9/27/83
DATE FINISH	9/27/83
BORING LOCATION	See site sketch
DRILLING EQUIPMENT / SIZE / TYPE	CME 55 3¼ inch I.D. hollow stem auger
TIME START	4:30P
TIME FINISH	5:45P
COMPLETION DEPTH	15 feet
BEDROCK DEPTH	–
TOP OF CASING	–
ANNULUS FILL MATERIAL: ABOVE PACKING	
PACKING	
SCREEN	
WELL CASING TYPE AND QUANTITY	No well installed; backfilled hole with cuttings after sampling.
SCREEN INTERVAL TYPE AND QUANTITY	
PERSONNEL	L. Sherry Otto; D. Ken Bosie; H. Enrique Gonzalez

ELEV.	DESCRIPTION	DEPTH	Sample No	Sampler Type	Sample Recovery Ft	Penetrometer (Strength)	N Value Blows	REMARKS
	0.0-1.5 Black gravelly silty Fill Material	0	S_1					No indication on OVA at bore hole or sample
	1.5-4.8 Gray silty Clay, trace pebbles, trace roots, brown sand (medium grain) filling fractures	1	S_2	CS	50			
	4.8-5.0 Black silty Sand fine to medium grain, trace roots, moist	5						
	5.0-5.8 Same as above		S_3	CS	42			Same as above
	5.8-7.7 Black Silt some roots, moist	6						
	7.7-8.0 Dark gray Clay, wet	7						
	8.0-10.0 Light gray Sand medium grain, trace roots, trace yellow staining, wet	8						
	10.0-15.0 Gray brown Sand medium grain, wet	10		CS				
	Boring complete	15						

Groundwater level at completion was 5.4 feet from surface
Bailed several volumes prior to sampling.
Water samples taken for metals and organics.
Samples S_1, S_2, and S_3 taken for metals.

IL 532-1112

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BORING NO. Grid #19	WELL NO. –	GROUNDLEVEL ELEV –	PAGE 1 OF 1
COUNTY Cook	SITE NO. –		
SITE Mann Park			
BORING LOCATION See site sketch			
DRILLING EQUIPMENT CME 55	SIZE 3¼ inch I.D.	TYPE hollow stem auger	
COMPLETION DEPTH 10 feet	BEDROCK DEPTH –	TOP OF CASING –	

DATE START	DATE FINISH	TIME START	TIME FINISH
9/20/83	9/20/83	8:30A.	9:30A.

ANNULUS FILL MATERIAL: ABOVE PACKING / PACKING / SCREEN

WELL CASING — TYPE AND QUANTITY: No well installed; backfilled hole with cuttings after sampling.

SCREEN INTERVAL — TYPE AND QUANTITY:

PERSONNEL: L. Sherry Otto; O. Ken Bosie; H. Enrique Gonzalez

ELEV	DESCRIPTION	DEPTH	Sample No.	Sampler Type	Sample Recovery Ft.	Penetrometer (Strength)	N Value (Blows)	REMARKS
	0.0-0.8 Black clayey Silt, roots	0	S_1					Raining, OVA not used, no odor detected
	0.8-2.2 Brown to dark brown sandy Silt mottled, trace pebbles	1	S_2					
	2.2-3.3 Same as above	2		CS	4.6			
	3.3-3.8 Black clayey Silt, roots abundant	3						
	3.8-4.6 Light brown Sand medium to very coarse grain, moist	4						
	5.0-6.0 Orange brown Sand medium grain, wet	5	S_3					Same as above
	6.0-7.7 Brown Sand fine to medium grain, wet	6						
		7		CS	3.7			
	7.7-8.6 Gray Sand fine to medium grain, wet	8						
		9						
		10						

Boring complete

Groundwater level at completion was 5.1 feet from surface.

Water samples taken for metals and organics.

Samples S_1, S_2, and S_3 taken for metals.

Illinois Environmental Protection Agency

BORING NO	Grid #20
WELL NO.	-
GROUNDLEVEL ELEV.	-
PAGE	1 OF 1
COUNTY	Cook
SITE NO.	-
SITE	South portion of Wolfe Lake Conservation Area
BORING LOCATION	See site sketch
DRILLING EQUIPMENT	CME 55
SIZE	3¼ inch I.D.
TYPE	hollow stem auger
COMPLETION DEPTH	10 feet
BEDROCK DEPTH	-
TOP OF CASING	-
DATE START	9/20/83
DATE FINISH	9/20/83
TIME START	11:00A.
TIME FINISH	12:00A.
ANNULUS FILL MATERIAL: ABOVE PACKING	
PACKING	--
SCREEN	
WELL CASING TYPE AND QUANTITY	No well installed; backfilled with cuttings after sampling.
SCREEN INTERVAL TYPE AND QUANTITY	
PERSONNEL	L. Sherry Otto; D. Ken Bosie; H. Enrique Gonzalez

ELEV.	DESCRIPTION	DEPTH	Sample No.	Sampler Type	Sample Recovery Ft	Penetrometer (Strength)	N Value (Blows)	REMARKS
	0.0-0.7 Dark brown Sand medium grain, some pebbles, trace orange staining, roots	0	S_1					Raining, OVA not used; no odor
	0.7-0.8 Black Organic Material, wood chips and roots	1	S_2					
	0.8-3.9 Dark gray Sand fine to medium grain, trace black staining, moist	2 (▼)		CS	3.9			
		3						
		4						
	5.0-5.7 Black Organic Material	5						Same as above
	5.7-6.8 Gray Sand fine to medium grain, some roots, wet	6	S_3	CS	1.8			
		7						
	7.5-10.0 Gray Sand fine to medium grain, wet	8						Same as above
		9		CS	2.5			
		10						

Boring complete

Groundwater level at completion was 1.9 feet from surface. Bailed several volumes.

Water samples were taken for metals and organics.

Samples S_1, S_2, and S_3 were take for metals.

IL 532-1112

Illinois Environmental Protection Agency

BORING NO. Grid #21 | WELL NO. – | GROUNDLEVEL ELEV. – | PAGE 1 OF 1

COUNTY Cook | SITE NO –

SITE Lincoln Avenue Grade School

BORING LOCATION See site sketch

DRILLING EQUIPMENT CME 55 | SIZE 3¼ inch | TYPE I.D. hollow stem auger

COMPLETION DEPTH 10 feet | BEDROCK DEPTH – | TOP OF CASING –

DATE: START 9/13/83 FINISH 9/13/83

TIME: START 2:00P FINISH 3:30P

ANNULUS FILL MATERIAL: ABOVE PACKING | PACKING | SCREEN

WELL CASING TYPE AND QUANTITY No well installed; backfilled hole with cuttings at completion.

SCREEN INTERVAL TYPE AND QUANTITY

PERSONNEL: L. Sherry Otto; D. Ken Bosie; H. Enrique Gonzalez

ELEV	DESCRIPTION	DEPTH	Sample No.	Sampler Type	Sample Recovery Ft.	Penetrometer (Strength)	N Value (Blows)	REMARKS
	0.0-0.4 Black silty Gravel, many roots	0	S_1					No odor detected, OVA not operative
	0.4-2.0 Light brown Sand very fine to fine grain, trace roots, red orange staining at 1.6 ft. - 1.7 ft., dry	1	S_2					
		2		CS	2.0			
		3						
		4						
	5.0-5.3 Light brown Sand very fine to fine grain, dry	5						Same as above
	5.3-6.5 Dark brown to black Sand, fine to medium grain, some pebbles, some roots, dry	6	S_3					
	6.5-6.7 large tree root	7		CS	2.6			
	6.7-7.5 Light brown Sand fine to medium grain, red orange staining, some roots, moist	8						
		9						
	Boring complete	10						

Dry hole at completion.

No water samples taken.

Samples S_1, S_2, and S_3 taken for metals only.

Illinois Environmental Protection Agency

BORING NO.	Grid #22
WELL NO.	-
GROUNDLEVEL ELEV.	-
PAGE	1 OF 1
COUNTY	Cook
SITE NO.	-
SITE	John W. Needles Park
BORING LOCATION	See site sketch
DRILLING EQUIPMENT	CME 55
SIZE	3¼ inch I.D.
TYPE	hollow stem auger
COMPLETION DEPTH	10 feet
BEDROCK DEPTH	-
TOP OF CASING	-
DATE START	9/13/83
DATE FINISH	9/13/83
TIME START	9:00A.
TIME FINISH	10:30A.
ANNULUS FILL MATERIAL: ABOVE PACKING	
PACKING	
SCREEN	
WELL CASING TYPE AND QUANTITY	No well installed; backfilled hole with cuttings after sampling
SCREEN INTERVAL TYPE AND QUANTITY	
PERSONNEL	L. Sherry Otto; D. Ken Bosie; H. Enrique Gonzalez

ELEV.	DESCRIPTION	DEPTH	Sample No	Sampler Type	Sample Recovery Ft.	Penetrometer (Strength)	N Value (Blows)	REMARKS
	0.0-0.8 Black silt Sand, roots, fine to medium grain	0	S_1					No odor and no indication on OVA
	0.8-1.7 Brown Sand red orange stains throughout, fine to medium grain, dry	1	S_2					
	1.7-3.2 Gray light brown Sand, fine to medium grain, from 2.5 ft. - 2.6 ft. a coarse to very coarse sand, dry	2		CS	4.0			
	3.2-3.4 Orange stained Sand fine to medium grain, dry	3						
	3.4-3.9 Gray Sand fine to coarse grain with trace pebbles, dry	4						
	5.0-5.4 Gray Clay, dry	5						Same as above
	5.4-5.6 Gray Sand very fine grain, dry							
	5.6-10.0 Gray Clay thin bedded, varied with beds of light and dark gray clay, moist	6	S_3					
		7		CS	3.0			
		8						
		9						
		10						

Boring complete

Groundwater level at completion was 8.6 feet from surface.

Bailed well dry.

9-14-83 groundwater level was 8.6 feet from surface.

Water samples were taken for metals and organics.

Samples S_1, S_2, and S_3 were taken for metals.

Illinois Environmental Protection Agency

BORING NO. Grid #23	WELL NO. —	GROUNDLEVEL ELEV. —	PAGE 1 OF 1
COUNTY Cook	SITE NO. —		

SITE: Hoxie Tot Lot

BORING LOCATION: See site sketch

DRILLING EQUIPMENT / SIZE / TYPE: CME 55 3¼ inch I.D. hollow stem auger

COMPLETION DEPTH: 10 Feet | BEDROCK DEPTH: — | TOP OF CASING: —

WELL CASING / TYPE AND QUANTITY: No well installed; backfilled hole with cuttings at completion

SCREEN INTERVAL / TYPE AND QUANTITY:

	START	FINISH
DATE	9/14/83	9/14/83
TIME	7:40A.	8:30A.

ANNULUS FILL MATERIAL: ABOVE PACKING / PACKING / SCREEN

PERSONNEL:
L. Sherry Otto
D. Ken Bosie
H. Enrique Gonzalez

ELEV.	DESCRIPTION	DEPTH	Sample No.	Sampler Type	Sample Recovery Ft.	Penetrometer (Strength)	N Value (Blows)	REMARKS
	0.0-2.0 Dark brown to black silty Clay very thin sandy gravelly seams at 1.7, 1.1, 1.4, 1.5, 1.9 feet, some roots, dry	0	S_1					No odor detected, OVA not operative
		1	S_2					
	2.0-5.0 Black clayey Silt, some roots, trace red orange staining	2		CS	5.0			
		3						
		4						
	5.0-5.4 Same as above	5						Same as above
	5.4-6.0 Dark gray to brown Clay, moist							
	6.0-10.0 Brown gray Sand fine to medium grain, trace roots, trace orange stain, wet from 7Ft.-10Ft.	6	S_3					
	▼	7		CS	5.0			
		8						
		9						
		10						

Boring complete

Groundwater level at completion was 8.9 feet from surface.

Unable to obtain enough water for samples.

Samples S_1 and S_2 taken for metals and organics.

Sample S_3 taken for metals only.

Illinois Environmental Protection Agency

BORING NO.	Grid #24
WELL NO.	–
GROUNDLEVEL ELEV.	–
PAGE	1 OF 1
COUNTY	Cook
SITE NO.	–
SITE	Burnham Park
BORING LOCATION	See site sketch
DRILLING EQUIPMENT / SIZE / TYPE	CME 55 3¼ inch I.D. hollow stem auger
COMPLETION DEPTH	10 feet
BEDROCK DEPTH	–
TOP OF CASING	–
DATE START	9/14/83
DATE FINISH	9/14/83
TIME START	10:00A.
TIME FINISH	11:00A.
ANNULUS FILL MATERIAL: ABOVE PACKING	
PACKING	
SCREEN	
WELL CASING TYPE AND QUANTITY	No well installed; backfilled with cuttings after sampling
SCREEN INTERVAL TYPE AND QUANTITY	
PERSONNEL	L. Sherry Otto; D. Ken Bosie; H. Enrique Gonzalez

ELEV	DESCRIPTION	DEPTH	Sample No.	Sampler Type	Sample Recovery Ft	Penetrometer (Strength)	N Value (Blows)	REMARKS
	0.0-0.2 Asphalt and roots	0	S_1					No odor detected, OVA not operative
	0.2-2.0 Black silty Sand, trace roots, moist	1	S_2					
	2.0-4.0 Light brown Sand fine to coarse grain, wet	2–4		CS	4.0			
	5.0-6.8 Same as above	5–10	S_3	CS	1.8			Same as above

Boring complete

Groundwater level at completion was 4.1 feet from surface.

Water samples taken for metals and organics.

Samples S_1 and S_2 taken for metals and organics.

Sample S_3 taken for metals only.

Illinois Environmental Protection Agency

BORING NO	Grid #25
WELL NO.	-
GROUNDLEVEL ELEV.	-
PAGE	1 OF 1
COUNTY	Cook
SITE NO.	-
SITE	B... ham Woods Golf Course
BORING LOCATION	See site sketch
DRILLING EQUIPMENT	CM... 55
SIZE	3¼ inch I.D.
TYPE	hollow stem auger
COMPLETION DEPTH	15...
BEDROCK DEPTH	—
TOP OF CASING	—
DATE START	9/28/83
DATE FINISH	9/28/83
TIME START	1:30P.
TIME FINISH	3:00P.
ANNULUS FILL MATERIAL: ABOVE PACKING	
PACKING	
SCREEN	
WELL CASING TYPE AND QUANTITY	No well installed; backfilled hole with cuttings after sampling.
SCREEN INTERVAL TYPE AND QUANTITY	
PERSONNEL	L. Sherry Otto; D. Ken Bosie; H. Enrique Gonzalez

ELEV	DESCRIPTION	DEPTH	Sample No	Sampler Type	Sample Recovery Ft.	Penetrometer (Strength)	N Value (Blows)	REMARKS
	0.0 - 0.4 Black clayey Silt, roots	0	S_1					No indication on OVA at bore hole or sample.
	0.4 - 2.7 Brown Sand medium grain, dry	1–5	S_2	CS	2.7			
	5.0 - 7.5 Same as above	5–7.5	S_3	CS	2.5			No detection on OVA.
	7.5 - 10.0 Same as above	7.5–10		CS	2.0			No detection on OVA.
	10.0 - 15.0 Same as above	10–15		CS				Lost shoe of continuous sampler down hole on last sample.

Boring complete

Groundwater level at completion was 6.2 feet from surface.

Water samples were taken for metals and organics.

Samples S_1, S_2, and S_3 were taken for metals only.

APPENDIX D

HA 03 GRAND CAL
FORSYTHE

ATTACHMENT 3

DATE	DISCHARGE (CPS)					SULFATE (SO4) (MG/L)	MBAS (MG/L)	TURBIDITY UNITS
671002								91
670927								55
670912		....						9
670907		20.0	7.5	0.004	9.10			18
670829		21.1	7.4	0.002	6.23			10
670801		22.2	7.4		2.00			10
670727		21.7	7.5		1.83			5
670718		20.6	7.4	0.003	5.60			3
670628		18.9	7.3	0.004	3.50			45
670623		20.6	7.2	0.005	12.03			16
670613		21.1	7.3	0.000	5.50			65
670606		17.8	7.4	0.001	7.33			18
670602		16.7	7.4	0.002	6.00			8
670525		15.6	7.3	0.004	6.00			28
670516		13.3	7.4	0.002	0.73			2
670509		15.6	8.5	0.000	0.30			30
670502		11.1	7.5	0.002	3.13			12
670425		11.1	7.4	0.002	0.40			16
670418		11.1	7.7	0.003	0.40			25
670411		7.8	7.6	0.004	3.50			25
670403		12.2	7.6	0.003	6.50			28
670328		11.7	7.5	0.003	2.23			9
670321		6.7	7.5	0.001	2.70			18
670314		8.9	7.6	0.003	6.00			32
670307		3.3	7.5	0.007	7.00			31
670227		3.3	7.5	0.005	5.00			83
670221		4.4	7.5	0.008	5.00			31
670214		10.0	7.4	0.008	10.40			55
670124		12.2	6.9	0.009	7.00			8
670117		3.3	7.2	0.009	5.00			42
670110		10.0	7.3	0.020	9.60			131

HA 03 GRAND CALUMET RIVER
FORSYTHE AVENUE --CONTINUED

DATE	BOD 5 DAY (MG/L)	COD (MG/L)	SUSPENDED SOLIDS (MG/L)	CADMIUM (MG/L)	HEX CHROMIUM (MG/L)	TRI CHROMIUM (MG/L)	COPPER (MG/L)	CYANIDE (MG/L)	TOTAL IRON (MG/L)	LEAD (MG/L)	ZINC (MG/L)	FLOURIDE (MG/L)	HARDNESS (CACO3) (MG/L)	ALKALINITY (CACO3) (MG/L)
710105								0.060						
690827				0.000					0.0	0.00		0.0		
690819				0.000					0.0	0.00		0.0		
690811				0.000					0.0	0.00		0.0		
690806				0.000					0.0	0.00		0.0		
690730				0.000					0.0	0.00		0.0		
690725				0.000					0.0	0.00		0.0		
690716				0.000					0.0	0.00		0.0		
690711				0.000					0.0	0.00		0.0		
690325								0.230						

HAA 01 CALUMET RIVER
130TH STREET BRIDGE SOUTH OF LAKE CALUMET
LAB: CHICAGO

DATE	DISCHARGE (CPS)	TEMPERATURE DEG C	DISSOLVED OXYGEN (MG/L)	PH UNITS	TOTAL PHOSPHORUS (MG/L)	PHENOLS (MG/L)	FECAL COLIFORM (NO/.1L)	AMMONIA NITROGEN (MG/L)	NITRATE + NITRITE (MG/L)	SPEC COND UMHOS	CHLORIDE (MG/L)	SULFATE (SO4) (MG/L)	MBAS (MG/L)	TURBIDITY UNITS
740926		19.4	7.1	8.2	0.080	0.000	100	0.07	1.2	450			0.20	
740715		26.1	6.4	7.8	0.380	0.000	1100	0.46	1.3	467			0.10	
740627		22.2	7.1	7.9	0.100	0.000	100	0.40	1.8	617	75	70	0.40	
740524		19.4	6.2	8.3	0.260	0.000	100	0.75	1.7	750			0.20	
740419		15.0	8.5	7.8	0.063	0.000	100	0.33	1.9	833	120	120	0.50	
740315		8.3	9.8	7.9	0.070	0.000	100	1.80	1.7	950			0.40	
740219		7.2	10.7	7.9	0.023	0.005	30	1.53	1.6	853			0.43	
740116		0.0	10.7	7.7	0.063	0.005	10	1.20	2.0		120	105	0.50	

NAA 01 CALUMET RIVER
130TH STREET BRIDGE SOUTH OF LAKE CALUMET - CONTINUED

DATE	DISCHARGE (CFS)	TEMPERATURE DEG C	DISSOLVED OXYGEN (MG/L)	PH UNITS	TOTAL PHOSPHORUS (MG/L)	PHENOLS (MG/L)	FECAL COLIFORM (NO./.1L)	AMMONIA NITROGEN (MG/L)	NITRATE + NITRITE (MG/L)	SPEC COND UMHOS	CHLORIDE (MG/L)	SULFATE (SO4) (MG/L)	MBAS (MG/L)	TURBIDITY UNITS
731127		8.9	8.1	7.9	0.110	0.000	200	0.10	1.9	663			0.40	
731015		20.0	6.9	7.8	0.040	0.000	80	0.12	1.6	567			0.20	
730919		20.0	6.8	8.2	0.000	0.000	800	0.29	1.2	500	95	80	0.20	
730823		25.6	5.7	8.2	0.060	0.000	2100	0.28	1.3	467			0.20	
730709		25.6	5.6	8.1	0.040	0.000	200	0.51	0.5	411			0.80	
730626		22.2	8.2	7.9	0.170	0.000	270	0.63	0.8	467	43	55	0.80	
730510		20.0	6.3	7.8	0.000	0.000	130	0.60	0.5	650	33	71	0.60	
730509		17.8	7.8	7.2	0.420	0.000	100	0.52	[illegible]	430			0.20	
730430		15.6	7.5	8.3	0.350	0.000	550	0.75	0.6	481			0.50	
730205		7.2	7.5	7.7	0.060	0.010	40	1.00	1.5	650			0.40	
730124		3.3	7.5	7.5	0.000	0.000	50	0.70	0.9	400			0.30	
720628		21.1	8.5	7.9	0.550	0.000	100	0.50	0.8	333			0.25	
720425		11.1	9.5	8.1	0.042	0.000	100	1.30	0.8	493	53	56	0.35	17
720316		8.9	13.5	7.7	0.042	0.000	10	1.60	0.9	610			0.60	
720208		1.1	8.0	8.0	0.050	0.000	100	1.05	1.0	580	73	66	0.40	10
720112		3.3	13.0	8.0	0.370	0.000	100	1.10	0.9	550	60	70	0.15	20
711202		8.7	10.5	8.1	0.045	0.000	100	0.40	0.0		23	13	0.20	15
711116		10.6	8.0	8.0	0.000	0.000	63	0.53	0.2		55	32	0.20	13
711023		19.4	8.0	8.1	0.031	0.000	113	0.30	0.0		19	29	0.20	13
710915		22.8	6.0	8.1	0.065	0.000	100	0.40	0.0		22	33	0.20	17
710715		25.6	6.0	8.1	0.033	0.000	200		0.0		32	32	0.10	11
710623		26.1	4.5	8.1	0.033	0.000	1100	0.80	0.2		32	37	0.20	13
710512		17.8	7.0	8.2	0.033	0.000	133	1.40	0.5		62	66	0.30	13
710415		13.3	7.0	8.2	0.000	0.000	20	2.80	0.5		96	102	0.80	17
710317				8.0	0.000	0.000	10	2.70	0.2		88	94	0.30	17
710203		2.2	10.0	8.1	0.372	0.000	80	0.00	0.2		55	86	0.30	13
710113		3.9	8.0	7.5	0.033	0.000	100	0.53	0.2		72	106	0.60	13
701202		5.6	13.3	8.3	0.065	0.002	70	0.83	0.2		93	63	0.20	28
701118		10.6	8.0	7.9	0.131	0.000	350	0.70	0.2		30	45	0.20	15
701021		18.9	8.0	7.8	0.033		120		0.2		30	36	0.20	5
700917		21.1	6.0	8.0	0.098	0.000	900	0.00	0.0		25	38	0.20	15
700811		24.4	5.0	8.1	0.098		1800		0.0		25	31	0.10	8
700715		22.8	5.9	7.7	0.065	0.000	163	0.73	0.2		23	35	0.20	15
700617		25.0	7.0	7.7	0.033	0.000	60	0.00	0.0		38	50	0.10	8
700512		20.6	5.5	7.8	0.300	0.000	40	0.00	0.2		76	80	0.30	8
700416		15.0	7.0	7.7	0.033	0.000	90	2.20	0.2		97	85	0.20	13
700325		8.9	9.0	7.8	0.000	0.000	100	2.00	0.2		63	57	0.30	6
700115		1.7	13.6	7.4	0.033	0.000	500	1.00	0.2		80	57	0.50	13
691209		8.7	10.0	7.8	0.000	0.000	30	0.10	0.2		75	62	0.40	22
691120				8.0	0.065	0.000	300	1.30	0.2		63	52	0.20	22
691022		15.6	7.0	7.4	0.163	0.000	130	0.80	0.2		38	44	0.30	25
691001		19.4	6.9	8.1	0.033	0.000	100	0.20	0.0		23	35	0.30	22
690924		21.1	6.8	7.7	0.033	0.000	60	0.40	0.0		26	35	0.00	35
690827			4.7	7.5	0.065	0.000	2000	0.50	0.0		26	35	0.30	8
690716		26.1	4.8	7.5	0.098	0.000	133	3.03	0.3		24	36		13
690610		20.0	6.7	7.7	0.065	0.000	40	1.50	0.2		21	66	0.30	10
690514		18.3	4.8	7.7	0.131		40		0.2		58	76	0.23	11
690416			7.6	7.8	0.030		30	0.00	1.1		100	135	0.30	11
690319		10.0	7.9	7.8	0.033	0.000	10	2.20	1.6		82	100	0.60	13
690219		7.8	8.1	7.9	0.033		133		0.5		84	106	0.50	17
681209		5.6	8.1	8.2	0.163	0.000	110	1.40	0.5		27	30	0.30	28
681112		13.9	8.8	8.3	0.163	0.000	133	0.73	0.2		19	46	0.30	35
681017		20.6		7.8	0.033	0.000	160	1.20	1.1		31	42	0.40	53
680904		21.9		7.8	0.000		90		0.7		50	68	0.30	15
680831		25.6	4.3	8.1	0.333	0.000	233	1.20	0.7		33	48	0.30	8
680724		27.8		7.7	0.000		800		0.7		33	48	0.20	21
680718			5.6	7.9	0.333		233		0.7		42	44	0.30	38
680520				7.8	0.098		100		0.7		27	42	0.10	12
670913		21.1	5.1	7.4	0.163			1.40	0.2		28	53	0.13	26
670815		22.2	4.4	7.7	0.131			0.70	0.7		41	66	0.10	18

NAA 01 CALUMET RIVER
130TH STREET BRIDGE SOUTH OF LAKE CALUMET --CONTINUED

DATE	BOD 5 DAY (MG/L)	COD (MG/L)	SUSPENDED SOLIDS (MG/L)	CADMIUM (MG/L)	HEX CHROMIUM (MG/L)	TOTAL CHROMIUM (MG/L)	COPPER (MG/L)	CYANIDE (MG/L)	TOTAL IRON (MG/L)	LEAD (MG/L)	ZINC (MG/L)	FLUORIDE (MG/L)	HARDNESS (CACO3) (MG/L)	ALKALINITY (CACO3) (MG/L)
700627				0.000	0.00	0.03	0.16	0.030	0.5	0.03	0.3	0.6		

HAA 01 CALUMET RIVER
130TH STREET BRIDGE SOUTH OF LAKE CALUMET --CONTINUED

DATE	BOD 5 DAY (MG/L)	COD (MG/L)	SUS-PENDED SOLIDS (MG/L)	CADMIUM (MG/L)	HEX CHROM-IUM (MG/L)	TRI CHROM-IUM (MG/L)	COPPER (MG/L)	CYANIDE (MG/L)	TOTAL IRON (MG/L)	LEAD (MG/L)	ZINC (MG/L)	FLUOR-IDE (MG/L)	HARD-NESS (CACO3) (MG/L)	ALKA-LINITY (CACO3) (MG/L)
740419				0.000	0.00	0.00	0.06	0.000	0.4	0.05	0.0	0.8		
740116				0.000	0.00	0.00	0.13	0.000	0.4	0.16	0.1	0.4		
730919				0.000	0.00	0.00	0.30	0.000	0.6	0.00	0.0	0.5		
730626				0.000	0.00	0.00	0.05	0.000	0.4	0.02	0.0	0.3		
730530				0.000	0.00	0.00	0.00		0.9	0.31	0.0	0.3		
720825				0.000	0.00	0.00	0.02		0.4	0.00	0.1	0.6		
720208		18		0.000	0.00	0.00	0.01	0.000	0.2	0.00	0.1	0.7	233	136
720112		21		0.000	0.00	0.00	0.00	0.000	0.0	0.00	0.1	0.5		112
711202		7		0.000	0.00	0.00	0.01	0.000	0.1	0.00	0.0	0.2	130	108
711116		13		0.000	0.00	0.00	0.01	0.000	0.1	0.00	0.0	0.3	140	134
711020		10		0.000	0.00	0.00	0.00	0.000	0.1	0.00	0.1	0.1	149	135
710915		12		0.000	0.00	0.00	0.00	0.000	0.1	0.00	0.0		143	128
710715		8		0.000	0.00	0.00	0.02	0.000	0.1	0.00	0.0	0.4	153	108
710623		13		0.000	0.00	0.00	0.01	0.000	0.1	0.00	0.0		150	138
710512		13		0.000	0.00	0.00	0.03	0.000	0.0	0.00	0.0	0.7	130	108
710415		22		0.000	0.00	0.00	0.00	0.000	0.0	0.00	0.0	1.0	223	120
710317		19		0.000	0.00	0.00	0.00	0.000	0.7	0.00	0.2		210	120
710203		17		0.000	0.00	0.00	0.00	0.000	0.6	0.00	0.1		233	120
710113		17		0.000	0.00	0.00	0.00	0.000	0.3	0.00	0.2		253	138
701202		8						0.000	0.1			0.5	143	120
701110		8		0.000	0.00	0.00	0.00	0.000		0.00	0.1		153	116
701021		6											143	104
700917		7		0.000	0.00	0.00	0.00	0.000		0.00	0.0	0.3	144	96
700811		12											160	109
700715		12						0.000	0.1			0.3	140	125
700617		12		0.000	0.00	0.00	0.00	0.000	0.3	0.00	0.2	0.8	160	138
700512		13		0.000	0.00	0.00	0.00	0.000	0.5	0.00	0.2	0.6	183	112
700416		13		0.000	0.00	0.00	0.00	0.000	0.9	0.08	0.4		220	116
700325		13		0.000	0.00	0.00	0.00	0.000	0.6	0.03	0.4	0.7	193	124
700115		13		0.000	0.00	0.00	0.00	0.000	0.7	0.60	2.0		180	100
691209		17						0.000	0.6			0.8	193	138
691123		16						0.000					180	112
691022		7		0.000	0.00	0.00	0.00	0.000	0.3	0.00	0.0	0.8	160	108
691001		8						0.000					143	138
690924		5		0.000	0.00	0.00	0.00	0.000	0.9	0.00	0.0	0.3	220	108
690827		11		0.000				0.000	0.3	0.00		0.1	143	134
690715		7		0.000	0.00	0.00	0.00	0.000	0.0	0.00	0.0	0.0	140	112
690610		3		0.000	0.00	0.00	0.00	0.000	0.2	0.00	0.5		173	112
690514		5		0.000	0.00	0.00	0.00			0.30	0.1		110	112
690416		5		0.000	0.00	0.00	0.00		0.6	0.00	0.1		190	116
690319		7						0.000	0.4			1.2	213	112
690219		2											220	84
681209		0						0.060	0.5			0.4	156	112
681112		4		0.000	0.00	0.00	0.00	0.000	0.5	0.00	0.0		143	116
681017		2						0.000					152	108
680904		5											172	96
680801		5						0.000					152	134
680724		5											172	106
680718		2											156	138
680528		5											156	104
670913		70											164	112
670815		4											168	96

HAA 01 CALUMET RIVER
130TH STREET BRIDGE SOUTH OF LAKE CALUMET --CONTINUED

DATE	ARSENIC (MG/L)	BARIUM (MG/L)	BORON (MG/L)	CHROM-IUM (MG/L)	DIS-SOLVED IRON (MG/L)	MANG-ANESE (MG/L)	MERCURY (UG/L)	NICKEL (MG/L)	SEL-ENIUM (MG/L)	SILVER (MG/L)	OIL (MG/L)	ROE (MG/L)	VSS (MG/L)
740627	0.000	0.1	0.2			0.08	0.2	0.0	0.00	0.000			
740419	0.000	0.0	0.4			0.11	0.3	0.0	0.00	0.000			
740116	0.000	0.0	0.2			0.11	0.0	0.0	0.00	0.000			
730919	0.000	0.0	0.2			0.07	0.3	0.0	0.00	0.000			
730626	0.000	0.0	0.2			0.00	0.0	0.0	0.00	0.000			
730530	0.000	0.0	0.1			0.07	0.4	0.0	0.00	0.000			
720825	0.000					0.06		0.0					
720208	0.000					0.06		0.0					
720112	0.000					0.00		0.0					

MAA 01 CALUMET RIVER
130TH STREET BRIDGE SOUTH OF LAKE CALUMET --CONTINUED

DATE	ARSENIC (MG/L)	BARIUM (MG/L)	BORON (MG/L)	CHROMIUM (MG/L)	DIS-SOLVED IRON (MG/L)	MANGANESE (MG/L)	MERCURY (UG/L)	NICKEL (MG/L)	SELENIUM (MG/L)	SILVER (MG/L)	OIL (MG/L)	NOC (MG/L)	VSS (MG/L)
711202	0.000					0.10		0.0					
711116	0.000					0.10		0.0					
711020	0.000					0.00		0.0					
710915	0.000					0.10		0.0					
710715	0.000					0.10		0.0					
710623	0.000					0.10		0.0					
710512	0.000					0.00		0.0					
710415	0.000							0.0					
710317	0.000					0.00		0.0					
710203	0.000							0.0					
710113	0.000					0.50							
701118	0.000					0.20		0.0					
700917		0.0						0.0					
700617		0.0				0.10		0.0					
700512		0.0				0.10							
700416		0.0				0.00		0.0					
700325	0.000	0.0				0.20		0.0					
700115	0.000	0.0				0.30		0.0					
691022	0.000	0.0						0.0					
690924	0.000	0.0				0.20		0.0					
690716	0.000	0.0						0.0					
690610	0.000	0.0				0.10		0.0					
690514	0.000	0.0						0.0					
690416	0.000	0.0				0.20		0.0					
681112	0.000	0.0				0.10		0.0					

MAA 02 CALUMET RIVER
US 41-EWING AVENUE BRIDGE NEAR MOUTH AT LAKE
LAB: CHICAGO

DATE	DIS-CHARGE (CFS)	TEMP-ERA-TURE DEG C	DIS-SOLVED OXYGEN (MG/L)	PH UNITS	TOTAL PHOS-PHORUS (MG/L)	PHENOLS (MG/L)	FECAL COLIFORM (NO/.1L)	AMMONIA NITRO-GEN (MG/L)	NITRATE + NITRITE (MG/L)	SPEC COND UMHOS	CHLOR-IDE (MG/L)	SULFATE (SO4) (MG/L)	MBAS (MG/L)	TURBID-ITY UNITS
740923		23.0		7.9	0.070	0.000	100	0.20	0.0	300			0.10	
740717		24.4	7.0	8.2	0.050	0.000	100	0.37	0.5	300	18	28	0.10	
740627		17.0	7.4	7.6	0.550	0.000	100	0.38	1.8	350			0.20	
740521		17.8	10.2	8.0	0.090	0.000	110	0.40	0.7	400			0.20	
740422		13.0	9.0	7.9	0.040	0.000	100	0.60	0.2	400			0.20	
740315		10.0	9.8	7.4	0.050	0.000	100	0.70	0.8	450			0.20	
740219		6.7	11.0	8.0	0.120	0.000	10	0.90	0.3	406	20	38	0.20	
740116		5.4	11.1	7.4	0.040	0.000	30	1.00	0.5				0.40	
731129		11.1	8.5	8.5	0.050	0.000	100	0.40	0.7	410			0.20	
730626		20.0	8.6	8.0	0.060	0.000	130	0.37	0.5	317			0.80	
730509		18.4		8.0	0.150	0.000	100	0.70	0.4	300			0.20	
730430		13.3		8.1	0.020	0.005	60	0.49	0.3	317			0.20	
730205		7.2	6.0	7.8	0.000	0.005	10	0.90	0.6	350			0.37	
730124		0.0	7.5	7.8	0.030	0.000	20	0.60	0.7	367			0.30	
720628		21.1	8.5	7.9	0.030	0.000	100	0.20	0.2	243	11	23	0.25	6
720425		11.1	10.0	8.0	0.012	0.000	100	1.30	0.8	480			0.35	
720316		10.4	9.5	7.6	0.025	0.003	10	1.00	0.6	430			0.40	
720208		4.4	11.0	8.0	0.053	0.000	100	0.80	0.5	360	25	38	0.40	8
720112		7.8	9.0	8.0	0.060	0.000	40	1.20	0.6	450	50	43	0.30	8
711207				7.5	1.664	0.000	20000	22.60	0.0		115	123	2.40	8
711202		6.7	11.5	8.0	0.065	0.000	70	0.30	0.0		20	33	0.10	11
711116		13.9	9.0	8.1	0.030	0.000	100	0.30	0.0		26	27	0.20	6
711020		17.8	9.0	8.1	0.000	0.000	20	0.20	0.0		13	24	0.30	6
710915		19.4	9.0	8.2	0.030	0.000	100	0.30	0.0		11	21	0.30	5
710715		22.8	7.0	8.0	0.040	0.000	100	0.40	0.0		15	22	0.13	5
710623		21.7	8.3	8.2	0.065	0.000	30	0.50	0.0		14	25	0.20	6
710512		13.9	8.5	8.2	0.033	0.000	100	0.70	0.0		23	28	0.20	8
710415		13.3	8.0	8.1	0.000	0.000	13	0.80	0.2		24	36	0.20	11
710317				8.0	0.030	0.000	40	0.60	0.2		38	45	0.10	6
710203		4.4	6.0	8.1	0.196	0.030	13	0.90	0.0		23	37	0.13	13
710113		3.1	13.0	7.6	0.033	0.030	1400	0.90	0.0		10	17	0.20	5
701202		8.3	8.0	7.9	0.131	0.000	140	0.80	0.0		60	34	0.20	13
701118		11.1	9.3	7.8	0.359	0.000	300	0.00	0.0		19	29	0.20	13
701021		15.0	10.0	7.6	0.013	0.000	40	0.10	0.0		14	26	0.20	5
700917		17.8	8.5	8.4		0.000	220	0.00	0.0		11	23	0.10	6

HAA 02 CALUMET RIVER
US 41-EWING AVENUE BRIDGE NEAR MOUTH AT LAKE --CONTINUED

DATE	DIS-CHARGE (CFS)	TEMP-ERA-TURE DEG C	DIS-SOLVED OXYGEN (MG/L)	PH UNITS	TOTAL PHOS-PHORUS (MG/L)	PHENOLS (MG/L)	FECAL COLIFORM (NO/.1L)	AMMONIA NITRO-GEN (MG/L)	NITRATE + NITRITE (MG/L)	SPEC COND UMHOS	CHLOR-IDE (MG/L)	SULFATE (SO4) (MG/L)	MBAS (MG/L)	TURBID-ITY UNITS
700811		22.2	7.0	8.1	0.098	0.000	200	0.00	0.0		41	28	0.10	6
700715		19.4	6.8	8.0	0.065	0.000	170	0.10	0.0		10	23	0.10	6
700617		20.0	9.5	8.1	0.065	0.000	20	0.00	0.0		11	23	0.10	8
700512		15.0	8.0	7.8	0.013	0.000	20	1.30	0.2		12	28	0.13	15
700416		12.8	9.0	7.7	0.033	0.010	60	1.00	0.2		22	26	0.00	11
700325		7.2	9.0	7.8	0.033	0.025	100	1.30	0.0		25	31	0.13	13
700218		2.8	13.1	8.0	0.390	0.000	230	0.10	0.0		8	25	0.20	13
700115		1.1	12.6	7.9	0.000	0.000	10	0.40	0.0		11	25	0.23	11
691209		11.7	9.1	7.8	0.065	0.300	30	0.60	0.2		37	36	0.23	15
691120				8.2	0.065	0.000	300	0.80	0.0		26	31	0.29	22
691022		14.4	8.5	7.3	0.065	0.000	130	0.00	0.0		27	26	0.13	17
691001		17.8	7.7	8.1	0.065	0.000	70	0.20	0.0		13	25	0.00	13
690924		19.4	8.3	7.9	0.065	0.000	600	0.30	0.0		11	25	0.20	19
690827			6.6	7.8	0.065	0.000	130	0.30	0.0		11	21	0.20	6
690716		23.3	6.2	7.9	0.065	0.000	100	0.20	0.0		13	24		5
690610		17.8	7.8	7.9	0.090	0.000	30	0.30	0.0		14	22	0.20	8
690514		14.4	8.6	8.2	0.131		80		0.0		14	24	0.20	13
690416			9.0	7.9	0.000	0.000	20	0.10	0.5		26	35	0.23	13
690319		8.9	12.2	8.2	0.000	0.300	10	0.80	0.7		22	29	0.33	15
690219		9.4	8.9	8.0	0.000	0.000	100	1.20	0.5		39	56	0.50	11
690106		1.1		8.3	0.065	0.010	130	0.30	0.3		23	29	0.30	33
681209		3.3	8.4	8.2	0.163	0.000	10	0.20	0.2		10	30	0.30	13
681112		9.4	10.5	8.2	0.131	0.000	1000	0.10	0.0		15	26	0.20	11
681017		18.9	8.1	8.2	0.392	0.000	530	0.30	0.5		14	23	0.83	17
680904		22.2		8.0	0.000		80		0.5		18	24	0.00	9
680724		22.8		7.8	0.333		430		0.5		13	32	0.13	11
680716				8.1	0.000		2000		0.2		15	24	0.20	6
680528				8.1	0.033		100		0.0		11	24	0.20	8
680508			8.2	8.1	0.131		23000		0.5		13	38	0.20	11
680116		2.2	11.7	8.0	0.033		100		0.0		20			6
671120		4.4	9.4	7.9	0.398		130	1.20	0.2		16	31	0.10	15
670913		20.0	7.1	8.1	0.522			0.60	0.2		18	28	0.10	8
670817		28.4	7.0					1.50						

HAA 02 CALUMET RIVER
US 41-EWING AVENUE BRIDGE NEAR MOUTH AT LAKE --CONTINUED

DATE	BOD 5 DAY (MG/L)	COD (MG/L)	SUS-PENDED SOLIDS (MG/L)	CADMIUM (MG/L)	HEX CHROM-IUM (MG/L)	TRI CHROM-IUM (MG/L)	COPPER (MG/L)	CYANIDE (MG/L)	TOTAL IRON (MG/L)	LEAD (MG/L)	ZINC (MG/L)	FLUOR-IDE (MG/L)	HARD-NESS (CACO3) (MG/L)	ALKA-LINITY (CACO3) (MG/L)
740717				0.000	0.00	0.00	0.04	0.000	0.2	0.13	0.0	0.3		
740219				0.000	0.00	0.00	0.20	0.380	0.2	0.45	0.1	0.5		
720628				0.005	0.00	0.00	0.00	0.000	0.2	0.00	0.0	0.4		
720208		12		0.000	0.00	0.00	0.00	0.100	0.1	0.00	0.1	0.7	150	120
720112		15		0.000	0.00	0.00	0.00	0.370	0.1	0.00	0.1	0.7		112
711207	7		18					0.000				1.1		
711202		7		0.000	0.00	0.00	0.01	0.000	0.1	0.00	0.0	0.0	130	108
711116		8		0.000	0.00	0.00	0.01	0.000	0.1	0.00	0.0	0.0	130	104
711020		11		0.000	0.00	0.00	0.01	0.070	0.1	0.00	0.1	0.0	130	113
710915		13		0.000	0.00	0.00	0.00	0.300	0.1	0.00	0.0		120	108
710715		7		0.000	0.00	0.00	0.02	0.080	0.1	0.00	0.1	0.0	130	108
710623		14		0.000	0.00	0.00	0.01	0.160	0.1	0.00	0.0		140	112
710512		8		0.000	0.00	0.00	0.00	0.100	0.0	0.00	0.0	0.4	150	112
710415		12		0.000	0.00	0.00	0.00	0.000	0.0	0.10	0.0	0.5	150	116
710317		12		0.000	0.00	0.00	0.00	0.000	0.5	0.04	0.1		160	120
710203		15		0.000	0.00	0.00	0.00	0.280	1.7	0.00	0.1		163	128
710113		13		0.000	0.00	0.00	0.00	0.080	0.4	0.00	0.1		170	112
701202		5						0.000				0.4	150	116
701118		6		0.000	0.00	0.00	0.00	0.030		0.00	0.1		133	134
701021		8		0.000	0.00	0.00	0.00	0.000		0.00	0.0		143	104
700917		5		0.000	0.00	0.00	0.00	0.300		0.13	0.0	0.2	143	134
700811		10		0.000	0.00	0.00	0.00	0.200	0.4	0.00	0.1		160	145
700715		11						0.000	0.1			0.2	160	115
700617		7		0.000	0.00	0.30	0.00	0.360	0.2	0.30	0.1	0.2	143	138
700512		8		0.000	0.50	0.00	0.00	0.000	5.0	0.00	0.3	0.2	140	138
700416		6		0.000	0.00	0.30	0.00	0.360	0.4	0.33	0.3		153	112
700325		14		0.000	0.00	0.00	0.00	0.000	0.9	0.00	0.4	0.4	180	120

HAA 02 CALUMET RIVER
US 41-EWING AVENUE BRIDGE NEAR MOUTH AT LAKE --CONTINUED

DATE	BOD 5 DAY (MG/L)	COD (MG/L)	SUS-PENDED SOLIDS (MG/L)	CADMIUM (MG/L)	HEX CHROM-IUM (MG/L)	TRI CHROM-IUM (MG/L)	COPPER (MG/L)	CYANIDE (MG/L)	TOTAL IRON (MG/L)	LEAD (MG/L)	ZINC (MG/L)	FLUOR-IDE (MG/L)	HARD-NESS (CACO3) (MG/L)	ALKA-LINITY (CACO3) (MG/L)
700218		12		0.000	0.00	0.00	0.00	0.000	0.1	0.30	0.1	0.2	153	123
700115		8		0.000	0.00	0.00	0.00	0.000	0.6	0.10	1.0		156	116
691201		12		0.000	0.00	0.00	0.00	0.000	0.7	0.00	0.7	0.1	160	106
691123		13						0.000					150	112
691022		5		0.000	0.00	0.00	0.00	0.000	0.4	0.00	0.1	0.2	240	108
691001		6						0.000					143	108
690924		4		0.000	0.00	0.00	0.00	0.000	0.0	0.00	0.0	0.2	210	108
690827		8		0.000				0.100	0.1	0.00		0.2	140	108
690716		5		0.000	0.00	0.00	0.00	0.000	0.0	0.80	0.0	0.0	130	[illegible]
690610		3		0.000	0.00	0.00	0.00	0.000	0.2	0.00	0.0		143	116
690514		5		0.000	0.00	0.00	0.30			0.00	0.0		143	112
690416		5		0.000	0.00	0.00	0.00		0.6	0.00	0.1		150	112
690319		5						0.000	0.9			0.4	145	116
690219		5						0.000					170	104
690106		0						0.000	1.2			0.2	150	116
681209		8						0.000	0.6			0.2	143	108
681112		4		0.000	0.00	0.00	0.00	0.000	0.5	0.00	0.0		136	116
681017		2		0.000	0.00	0.00	0.00	0.000		0.00	0.0		136	138
680930		0											148	106
680724		8											156	108
680716		5											136	138
680520		5											132	138
680508		5											122	112
680116	2												152	116
671128		10											146	138
670913		50											156	108
670817		7												

HAA 02 CALUMET RIVER
US 41-EWING AVENUE BRIDGE NEAR MOUTH AT LAKE --CONTINUED

DATE	ARSENIC (MG/L)	BARIUM (MG/L)	BORON (MG/L)	CHROM-IUM (MG/L)	DIS-SOLVED IRON (MG/L)	MANG-ANESE (MG/L)	MERCURY (UG/L)	NICKEL (MG/L)	SEL-ENIUM (MG/L)	SILVER (MG/L)	OIL (MG/L)	TOC (MG/L)	VSS (MG/L)
740717	0.000	0.0	0.1			0.06	0.0	0.0	0.00	0.000			
740219	0.000	0.0	0.1			0.10	0.0	0.0	0.00	0.000			
720628						0.06		0.0					
720208	0.000					0.10		0.0					
720112	0.000					0.08		0.0					
711202	0.000					0.00		0.0					
711116	0.000					0.10		0.0					
711020	0.000					0.00		0.0					
710915	0.000					0.10		0.0					
710715	0.000					0.00		0.0					
710623	0.000					0.10		0.0					
710512	0.000					0.00		0.0					
710415	0.000							0.0					
710317	0.000					0.30		0.0					
710203	0.000							0.0					
710113	0.000					0.10							
701118	0.000					0.20		0.0					
701021	0.000					0.00		0.0					
700917		0.0						0.0					
700811		0.0				0.00		0.0					
700617		0.0				0.00		0.0					
700512		0.0				0.30		0.0					
700416		0.0				0.20		0.0					
700325	0.000	0.0				0.10		0.0					
700218	0.000	0.0						0.0					
700115	0.000	0.0				0.10		0.0					
691209	0.000	0.0						0.0					
691022	0.000	0.0						0.0					
690924	0.000	0.0				0.00		0.0					
690716	0.000	0.0						0.0					
690610	0.000	0.0				0.00		0.0					
690514	0.000	0.0						0.0					
690416	0.000	0.0				0.10		0.0					
681112	0.000	0.0				0.00		0.0					

RA 01 GRAND CALUMET RIVER
TORRENCE AVENUE BRIDGE AT BURNHAM --CONTINUED

DATE	DIS-CHARGE (CFS)	TEMP-ERA-TURE DEG/C	DIS-SOLVED OXYGEN (MG/L)	PH UNITS	TOTAL PHOS-PHORUS (MG/L)	PHENOLS (MG/L)	FECAL COLIFORM (NO/.1L)	AMMONIA NITRO-GEN (MG/L)	NO3+NO2 NITRO-GEN (MG/L)	SPEC COND UMHOS	LEAD (MG/L)	FLOUR-IDE (MG/L)	CHLOR-IDE (MG/L)	SULFATE (SO4) (MG/L)
751028		21.5	0.5	8.2	2.000		200	18.00	0.4	1200				
750915		18.5	1.0	8.2	0.600		700	3.80	2.7	883				
750912		18.5	4.7	7.9	1.400	0.005	6500	4.80	0.2	933	0.03	0.9	95	110
750808		22.0	2.0	7.8	1.100		1700	7.00	0.3	1150				
750610		21.5	0.4	7.8	1.100		300	29.00	0.8	1350				
750417		16.5	4.0	7.8	0.750		9200	21.00	0.7	1400				
750227		5.5	5.9	8.5	0.750		1400	5.40	0.9	1067				
750116		6.0	5.5	8.0	0.620		2300	4.00	1.8	1017				
750103		6.0	5.7	8.6	0.650	0.000	500	5.10	1.5	1017	0.07	0.8	100	145
741204		8.5	3.2	8.3	1.800	0.102	14000	19.00	0.7	1200				

RA 01 GRAND CALUMET RIVER
TORRENCE AVENUE BRIDGE AT BURNHAM --CONTINUED

DATE	ARSENIC (MG/L)	BARIUM (MG/L)	BORON (MG/L)	CADMIUM (MG/L)	HEX CHROM-IUM (MG/L)	TRI CHROM-IUM (MG/L)	COPPER (MG/L)	TOTAL IRON (MG/L)	NICKEL (MG/L)	SEL-ENIUM (MG/L)	SILVER (MG/L)	ZINC (MG/L)	MBAS (MG/L)	NOR (MG/L)
770309	0.000	3.0	0.6	0.020	0.00		0.16		0.6	0.00	0.000			
760323	0.000	0.1	0.7	0.000	0.00	0.33	0.08	2.3	0.0	0.00	0.000	0.2	0.90	
751119	0.002	0.0	0.8	0.000	0.00	0.00	0.11	0.8	0.0	0.00	0.000	0.0	0.80	
751103	0.000	0.0	0.6	0.000	0.00	0.00	0.07	0.5	0.0	0.00	0.000	0.0	1.20	
750912	0.005	0.0	0.6	0.009	0.00	0.01	0.08	0.7	0.0	0.00	0.000	0.0	0.60	
750103	0.000	1.3	0.6	0.000	0.00	0.00	0.10	0.5	0.0	0.00	0.000	0.1	1.00	
741204													2.00	

RA 01 GRAND CALUMET RIVER
TORRENCE AVENUE BRIDGE AT BURNHAM --CONTINUED

DATE	SUS-PENDED SOLIDS (MG/L)	CYANIDE (MG/L)	MANG-ANESE (MG/L)	MERCURY (UG/L)	HARD-NESS (CACO3) (MG/L)	ALKA-LINITY (CACO3) (MG/L)
770309		0.030		1.0	320	260
760323		0.010	0.89	0.3		
751119		0.010	0.20			
751103		0.330	0.12	0.0		
750912		0.020	0.21	0.0		
750103		0.010	0.15	0.2		

RAA 01 CALUMET RIVER
130TH STREET BRIDGE SOUTH OF LAKE CALUMET
LAB: CHICAGO

DATE	DIS-CHARGE (CFS)	TEMP-ERA-TURE DEG/C	DIS-SOLVED OXYGEN (MG/L)	PH UNITS	TOTAL PHOS-PHORUS (MG/L)	PHENOLS (MG/L)	FECAL COLIFORM (NO/.1L)	AMMONIA NITRO-GEN (MG/L)	NO3+NO2 NITRO-GEN (MG/L)	SPEC COND UMHOS	LEAD (MG/L)	FLOUR-IDE (MG/L)	CHLOR-IDE (MG/L)	SULFATE (SO4) (MG/L)
770309		2.0	11.9	8.4	0.090	0.000	210	0.58	0.4	392	0.02	0.2	26	33
770126		0.0	13.3	8.8	0.000	0.000	600	0.32	0.2	341	0.01	0.3		26
761110		11.0	0.3	8.5	0.090		400	1.10	0.6	533				
761005		18.5	6.6	8.1	0.000	0.000	700	0.84	0.8	450	0.07	0.5	52	81
760803			5.9	8.3	0.080		100	0.11	1.3	483				
760614		24.0		8.4	0.030		100	1.00	0.5	467				
760428		15.5	8.5	8.2	0.050	0.000	100	0.58	0.5	517	0.01	0.5	55	52
760323		10.0	10.6	8.4	0.040		100	1.40	0.8	667				
760212		5.5	12.9	8.5	0.070		100	0.27	0.4	350				
760112		3.0	11.2	8.2	0.170	0.000	100	2.20	1.0	733	0.08	0.6	100	84
751119		12.0	8.1	8.3	0.110		100	0.43	1.0	650				
751103		15.5	7.7	7.9	0.060		100	0.26	1.2	600				
751028		17.0	8.1	8.5	0.090		100	0.30	1.2	617				
751016		20.0	7.8	8.3	0.050		100	0.26	1.8	567				
750912		20.0	5.9	8.3	0.090		900	0.20	1.3	533				

RAA 01 CALUMET RIVER
130TH STREET BRIDGE SOUTH OF LAKE CALUMET --CONTINUED

DATE	DIS-CHARGE (CFS)	TEMP-ERA-TURE DEG/C	DIS-SOLVED OXYGEN (MG/L)	PH UNITS	TOTAL PHOS-PHORUS (MG/L)	PHENOLS (MG/L)	FECAL COLIFORM (NO/.1L)	AMMONIA NITRO-GEN (MG/L)	NO3+NO2 NITRO-GEN (MG/L)	SPEC COND UMHOS	LEAD (MG/L)	FLOUR-IDE (MG/L)	CHLOR-IDE (MG/L)	SULFATE (SO4) (MG/L)
750805		24.0	5.3	8.3	0.040		200	0.12	1.0	483				
750610		21.5	5.8	7.9	0.050	0.000	100	0.78	1.1	600	0.01	0.6	75	55
750417		11.5	10.0	8.1	0.080		100	1.80	1.2	717				
750227		3.0	12.5	8.0	0.080	0.000	100	1.60	0.5	533	0.13	0.4	60	50
750116		1.5	12.4	8.0	0.050		100	0.74	0.7	467				
750103		3.5	11.6	8.5	0.040	0.000	100	0.42	0.4	400				
741204		5.0	10.6	8.2	0.040	0.000	7000	0.92	1.4	483	0.09	0.5	45	40

RAA 01 CALUMET RIVER
130TH STREET BRIDGE SOUTH OF LAKE CALUMET --CONTINUED

DATE	ARSENIC (MG/L)	BARIUM (MG/L)	BORON (MG/L)	CADMIUM (MG/L)	HEX CHROM-IUM (MG/L)	TRI CHROM-IUM (MG/L)	COPPER (MG/L)	TOTAL IRON (MG/L)	NICKEL (MG/L)	SEL-ENIUM (MG/L)	SILVER (MG/L)	ZINC (MG/L)	MBAS (MG/L)	DOC (MG/L)
770309	0.000	0.0	0.1	0.000	0.00	0.00	0.07	0.3	0.0	0.00	0.000	0.1		
770126	0.000	0.0	0.1	0.000	0.00	0.00	0.00	0.2	0.0	0.00	0.000	0.0		
761005	0.000	0.2	0.1	0.000	0.00	0.00	0.04	0.5	0.0	0.00	0.000	0.1		
760428	0.000	0.0	0.2	0.000	0.00	0.00	0.04	0.6	0.0	0.00	0.000	0.6	0.20	
760112	0.000	0.0	0.2	0.000	0.00	0.00	0.01	0.7	0.0	0.00	0.000	0.0	0.40	
750610	0.000	0.1	0.2	0.000	0.00	0.00	0.00	0.6	0.0	0.00	0.000	0.0	0.20	
750227	0.000	0.1	0.1	0.000	0.00	0.00	0.06	0.5	0.0	0.00	0.000	0.0	0.30	
750103													0.20	
741204	0.000	0.1	0.1	0.000	0.00	0.00	0.10	0.2	0.0	0.00	0.000	0.0	0.30	

RAA 01 CALUMET RIVER
130TH STREET BRIDGE SOUTH OF LAKE CALUMET --CONTINUED

DATE	SUS-PENDED SOLIDS (MG/L)	CYANIDE (MG/L)	MANG-ANESE (MG/L)	MERCURY (MG/L)	HARD-NESS (CACO3) (MG/L)	ALKA-LINITY (CACO3) (MG/L)
770309		0.020	0.03	0.0	150	120
770126		0.010	0.03	0.0		
761005		0.000	0.09	0.0		
760428		0.010	0.09	0.0		
760112		0.000	0.08	0.0		
750610		0.000	0.05	0.0		
750227		0.000	0.11	0.0		
741204		0.000	0.05	0.2		

RAA 02 CALUMET RIVER
US 41-EWING AVENUE BRIDGE NEAR SOUTH AT LAKE
LAB: CHICAGO

DATE	DIS-CHARGE (CFS)	TEMP-ERA-TURE DEG/C	DIS-SOLVED OXYGEN (MG/L)	PH UNITS	TOTAL PHOS-PHORUS (MG/L)	PHENOLS (MG/L)	FECAL COLIFORM (NO/.1L)	AMMONIA NITRO-GEN (MG/L)	NO3+NO2 NITRO-GEN (MG/L)	SPEC COND UMHOS	LEAD (MG/L)	FLOUR-IDE (MG/L)	CHLOR-IDE (MG/L)	SULFATE (SO4) (MG/L)
770314		3.5	11.2	8.3	0.030	0.000	100	0.12	0.3	320	0.00	0.2	12	25
770105		3.0	12.0	8.0	0.070		100	0.22	0.3	317				
761114		6.0	12.1	8.4	0.000	0.000	100	0.09	0.2	283	0.00	0.3	10	21
760930		18.5	8.1	8.6	0.000		100	0.09	0.3	300				
760830		16.5	6.6	8.3	0.040		100	0.10	0.2	300				
760429		14.5	9.8	8.5	0.020		100	0.12	0.3	350				
760324		10.0	11.3	8.2	0.120		100	0.12	0.5	350				
760304		6.0	11.3	8.3	0.730	0.000	110	0.19	0.4	317	0.05	0.3	13	25
760212		4.5	13.4	8.4	0.020		100	0.17	0.3	317				
760125		4.0	14.4	8.3	0.040		100	0.21	0.4	333				
751210		5.0	10.4	8.1	0.060		100	0.35	0.5	433				
751103		14.5	9.2	7.9	0.000		100	0.17	0.4	317		0.3	26	28
751002		15.5	8.5	8.1	0.050		100	0.40	0.0	317				

NAA C2 CALUMET RIVER
US 41-EWING AVENUE BRIDGE NEAR MOUTH AT LAKE --CONTINUED

DATE	DIS-CHARGE (CFS)	TEMPERATURE DEG/C	DISSOLVED OXYGEN (MG/L)	PH UNITS	TOTAL PHOSPHORUS (MG/L)	PHENOLS (MG/L)	FECAL COLIFORM (NO/.1L)	AMMONIA NITROGEN (MG/L)	NO3+NO2 NITROGEN (MG/L)	SPEC COND UMHOS	LEAD (MG/L)	FLOURIDE (MG/L)	CHLORIDE (MG/L)	SULFATE (SO4) (MG/L)
750905		21.5	7.2	8.3	0.020		200	0.18	0.4	317				
750807		21.5	8.3	8.2	0.030	0.000	100	0.22	0.4	317	0.00	0.3	8	29
750610		21.9	8.6	8.0	0.450		100	0.20	0.3	317				
750325		5.0	11.2	8.3	0.030	0.000	100	0.52	0.4	367	0.04	0.4	17	26
750319		9.0	11.1	8.1	0.040		100	0.86	0.4	400				
750203		4.5	11.4	8.4	0.020	0.000	100	0.64	0.4	400	0.04	0.5	21	30
750106		3.5	12.6	8.2	0.050		100	0.36	0.3	417				
741205		8.0	10.2	8.2	0.040	0.000	100	0.20	0.4	350				

NAA C2 CALUMET RIVER
US 41-EWING AVENUE BRIDGE NEAR MOUTH AT LAKE --CONTINUED

DATE	ARSENIC (MG/L)	BARIUM (MG/L)	BORON (MG/L)	CADMIUM (MG/L)	HEX CHROMIUM (MG/L)	TRI CHROMIUM (MG/L)	COPPER (MG/L)	TOTAL IRON (MG/L)	NICKEL (MG/L)	SELENIUM (MG/L)	SILVER (MG/L)	ZINC (MG/L)	MBAS (MG/L)	BOD (MG/L)
770314	0.000	0.0	0.0	0.000	0.00	0.00	0.00	0.1	0.0	0.00	0.000	0.0		
761118	0.000	0.0	0.0	0.000	0.00	0.00	0.02	0.3	0.0	0.00	0.000	0.0		
760304	0.000	0.0	0.1	0.000	0.00	0.00	0.06	0.6	0.0	0.00	0.000	0.0	0.10	
751103													0.10	
750807	0.000	0.0	0.1	0.000	0.00	0.00	0.01	0.2	0.0	0.00	0.000	0.0	0.10	
750325	0.000	0.0	0.1	0.000	0.00	0.00	0.12	0.2	0.0	0.00	0.000	0.2	0.20	
750203	0.000	0.1	0.1	0.000	0.00	0.00	0.12	0.3	0.0	0.00	0.000	0.0		
741205													0.10	

NAA 02 CALUMET RIVER
US 41-EWING AVENUE BRIDGE NEAR MOUTH AT LAKE --CONTINUED

DATE	SUSPENDED SOLIDS (MG/L)	CYANIDE (MG/L)	MANGANESE (MG/L)	MERCURY (UG/L)	HARDNESS (CACO3) (MG/L)	ALKALINITY (CACO3) (MG/L)
770314		0.000	0.02	0.0	140	120
761118		0.000	0.04	0.0		
760830		0.090				
760304		0.090	0.04	0.0		
750807		0.000	0.03	0.0		
750325		0.020	0.04	0.0		
750203		0.030	0.16	0.0		

NAA082 WOLF LAKE
INDIANA STATE LINE BEACH
LAB: CHICAGO

DATE	DIS-CHARGE (CFS)	TEMPERATURE DEG/C	DISSOLVED OXYGEN (MG/L)	PH UNITS	TOTAL PHOSPHORUS (MG/L)	PHENOLS (MG/L)	FECAL COLIFORM (NO/.1L)	AMMONIA NITROGEN (MG/L)	NO3+NO2 NITROGEN (MG/L)	SPEC COND UMHOS	LEAD (MG/L)	FLOURIDE (MG/L)	CHLORIDE (MG/L)	SULFATE (SO4) (MG/L)
770314		4.0	10.3	8.4	0.040	0.000	10	0.30	0.3	355	0.00	0.2	20	31
770125		4.5	7.5	8.2	0.040		100	0.26	0.2	453				
770105		3.5	11.7	8.0	0.020		100	0.36	0.9	433				
761118		5.0	13.1	8.4	0.000	0.000	100	0.16	0.1	400	0.01	0.5	28	42
760930		17.0	10.2	8.5	0.020		100	0.12	0.0	383				
760830		21.0	7.9	8.4	0.060	0.006	100	0.04	0.2	383	0.01	0.5	35	40
760429		14.5	11.0	8.5	0.040		100	0.08	0.3	450				
760324		11.0	11.3	8.4	0.090		100	0.06	0.4	417				
760304		6.0	11.5	8.3	0.130	0.000	10	0.28	0.4	400	0.04	0.5	28	42
751210		2.0	12.8	8.1	0.030		100	0.18	0.2	417				
751103		14.5	10.2	7.9	0.000	0.000	100	0.12	0.1	417	0.21	0.4	50	41
751002		11.5	9.8	8.3	0.000		100	0.05	0.0	400				
750807		24.5	8.6	8.7	0.020	0.000	100	0.10	0.2	350	0.00	0.8	40	40
750630		27.0	7.7	8.3	0.010		100	0.10	0.0	367				
750613		23.5	9.6	8.4	0.060		100	0.00	0.1	383				

APPENDIX E

No. 1
Cargill, Inc. IL0037087
Effective date of permit: 8/26/79
Expiration date of permit: 4/30/84
Receiving waters: Calumet River

Cargill, Inc. - Elevator/Grain Division IL0037087

DAF = 0.007 MGD 1
DMF = 0.01 MGD Outfall

Treated sanitary waste to the Calumet River.

001 Limits:	Avg./Max. Flow	6/9 P.H.	TSS 45/75	BOD 45/75	400 F.C.	CL_2 .75
Jan. '81	.0054/.0059	6.7/8.3	21.3/35	.6/2	60	2.1*2
March '81	5450/6100.	6.9/7.8	18/31	.4/4	---*1	---*1
June '81	.006/.006	---*1	19/40	5/25	30/100	0.75
April '82	.006/.007	7.3/7.6	17/27	2/4	56	3.0*2
Aug. '82	.006/.007	7.3/7.6	9/14	5/11	9400*2	---*1
Sept. '82	.006/.007	7.4/7.9	7/16	2/3	8200*2	N/R*1
EXCURSIONS	---	---	---	---	2	2

001/Sanitary wastewater

*1 Not reported

*2 excursion(s)

DR:ds:8018C/3,sp

No. 2
Cargill, Inc. IL0056057
Effective date of permit: 7/13/79
Expiration date of permit: 1/31/84
Receiving waters: Calumet River via drainage ditch

Cargill, Inc. - Domestic Soybean Crushing Division

DAF = 0.0059 MGD 1
DMF = 0.0065 MGD Outfall

Treated sanitary and industrial wastewater to the Calumet River.

001 Limits:	Avg./Max. Flow	6/9 P.H.	A/M TSS 30/75	BOD 30/75	+ -	F.C. 400	FOG 15/30	NH3
January '81	.054/.083	7.0/7.9	13/28	3.9/8	-	10	1/1	
April '82	.0731/.095	7.0/7.7	11/25	3/4		346	5/5	.5

001/Industrial, sanitary wastewater a yard drainage.

+ = temperature (no excursions)

002/surface runoff from

002 Limits:	Flow	P.H.	15 TSS	BOD	F.C.	15/30 FOG	NH3
April '82	.073/.095	7.0/7.7	11/25	3/4	346	5/5	.5
EXCURSIONS	---	---	*1	---	---	---	---

002/surface runoff from parking lot area

(*1) once per month sampling

DR:ds:8018C/2,sp

No. 3
Republic el Corp. IL0002593
Effective date of permit: 2/25/79
Expiration date of permit: 9/30/80
Receiving waters: Calumet River

Five outfalls listed which discharge to the Calumet River. 001, 002, and 005 are inactive but remain in existence. 003 is non-contaminated stormwater runoff. 004 is non-contact cooling water.

001, 002 and 005 process water overflow limits and or parameters applied to these outfalls: (concentration)

Flow	P.H	Temp.	TSS	Iron	Zinc	Lead	Chrom-Total-Max
---	6-9	<93/<100	15	2.0	1.0	0.1	0.3

Chrom-Total-tri	Oil/Fats and Grease
1.0	30

---

002 Treated process water blow down when discharge to Calumet River but not affective when discharged to MSDGC sewer system.

limits and/or parameters applied to this outfall

	Concentration				Load		
	30	7	Max		30	7	Max
Flow							
P.H.				(6 - 9)			
Temp				(<93/<100)			
TSS			15		414.3		441.3
TDS				750/3500 (background)			
Iron	2.0				55.2		58.8
Zinc	1.0				27.6		29.4
Lead	0.1				2.76		2.94
Chr.tot.-hex	0.3						
Chr.tot.-tri	1.0						
Chr.total							
Oil, fats, & gr	30				27.2		29.0
Fluoride	15				828.6		882.6
CN	0.2				.65		0.7
CN (Oxide)					.126		.252

004 Non-contact cooling water, reports flow and temp.

In the past year, Republic Steel has only discharged four times with most months reported no flow results as they for the most part operate a closed system. Additionally they have the ability to discharge to MSDGC and then have no limits. The company hasn't reported any excursions in the last year.

DR:ds:8018C/6,sp

No.'s 4 and 5

Interlake, Inc. (Chicago furnace plant) IL0002101

Effective date of permit: 9/23/75

Expiration date of permit: 7/1/78

Receiving waters: Calumet River

Permit allows direct discharge to the Calumet River from two outfalls which serve the Chicago Blast Furnace Plant (denoted on Map as α4) and One outfall which serves the Chicago Coke Plant (denoted on Map as α5). All discharges are once-through, non-contact cooling water. Potential exists for stormwater runoff to enter the stream prior to final sampling and discharge.

001	A/M Temp.	P.H. 6/9	Res. Dis.	Res. Susp.	G/O	Max NH_3	M CN*	M Iron*	M Phen.	M Flow
8/82	25/26	7.6/8.5	174.3	12.8	.897/1.6	.254	.010	.900	.255	8.640
9/82	21/22	7.8/8.4	171.5	76.8	1.3/2.4	.204	.015	1.024	.010	8.640
10/82	17/20	7.8/83	185.7	20.3	1.1/1.8	.250	.010	1.437	.010	8.640
11/82	11.5/14.4	7.7/9.4	250.	25.9	.941/1.772	.700	.010	1.767	.010	8.640
12/82	8.4/10.5	7.7/8.4	322.	15.8	1.17/1.412	1.050	.012	.741	.077	8.640
1/83	3.8/5.5	7.9/8.7	396.8	9.1	1.4/2.0	1.450	.025	.788	.027	8.640
2/83	4.8/5.5	7.9/8.8	280.7	18.2	2.4/5.5	.750	.012	.618	.017	8.640
3/83	7.3/11.1	8/8.2	259.1	10.7	5.0/11.1	.900	.030	1.52	.027	8.640
4/83	13.8/19.4	7.9/8.1	374.7	15.8	4.5/6.7	1.199	.010	1.19	.011	8.640
5/83	14.6/16.6	8/8.2	413.5	30.3	3.3/5	.850	.010	1.27	.022	8.640
6/83	19.8/21.1	7.7/8.4	211.0	15.0	3.1/8.6	.505	.010	.867	.100	8.640
7/83	22.5/22.7	7.6/8.2	213.0	14.5	2.81/6.3	.562	.010	1.09	.010	8.640
EXCURSIONS		---	---							

NPDES Permit: "For the purpose of this permit, these discharges are limited solely to non-contact cooling water and storm water uncontaminated by process wastewater. In the event that the permittee shall require the use of water treatment additives, this permit must be modified in accordance with Part II."

002 No Results

003	34/37(c) A/M Temp.	P.H.	Max. Res. Dis.	M Res. Susp.	A/M G/O	Max NH_3	M CN*	M Iron*	M Phen.	M Flow
8/82	25/26	7.7/8.2	190	8.8	.943/1.463	.503	.036	.952	.033	9.648
9/82	21/23	7.9/8.5	176.9	15.6	1.4/2.8	.400	.010	.602	.010	9.648
10/82	17.6/19.4	7.8/8.3	180.8	13.2	1.2/2.4	.503	.010	.659	.015	9.648
11/82	11.5/14.4	8/8.9	235.6	210.3	5.3/16.4	5.3	.825	17.1	.076	9.648
12/82	8.1/10.	7.7/8.3	419.2	72.7	2.2/5.0	1.9	.021	1.120	.044	9.648
1/83	4.5/6.1	7.8/8.4	349.2	16.7	1.6/3.9	1.5	.045	.545	.024	9.648
2/83	5.4/6.6	7.8/8.1	316.8	11.8	3.1/7.9	1.3	.017	.768	.016	9.648
3/83	7.7/11.6	7.8/80	355.9	26.4	1.3/1.9	2.2	.017	.926	.029	9.648
4/83	15.1/22.7	7.8/8.3	414.8	16	4.4/7.1	1.5	.027	1.179	.010	9.648
5/83	14.8/16.6	7.5/8.2	431.0	12.9	5.9/16.3	1.2	.085	.827	.065	9.648
6/83	19.5/21.1	7.6/8.3	226.3	8.1	1.8/3.4	.740	.015	.844	.107	9.648
7/83	26.5/36.6	7.5/8.1	200.4	9.3	2.4/5.5	1.2	.048	.763	.013	9.648

Part II:

1. Change of Discharge
2. N.O.N.'s
3. Facility Operation
4. Adverse Impact
5. Bypassing
6. Removed Substances
7. Power Failure
8. Right of Entry
9. Ownership
10. Available reports
11. Permit mod.
12. Toxic pollutants
13. C/C liability
14. Oil and Hazardous Substance liab.
15. State Laws
16. Property Rights
17. Severability
18. Other requirements

DR:ds:8018C/5,sp

No. 6
Interlak. (Riverdale) IL0002119
Effective date of permit: 3/19/79
Expiration date of permit: 9/30/80
Receiving waters: Little Calumet to Des Plaines River

Permit allows direct discharges to the Little Calumet River from four outfalls serving this facility. All outfalls are once-through, non-contact cooling water. The potential exists for stormwater runoff to enter the streams prior to final sampling and discharge.

Limits 002 Month	Flow Average	Flow Max.	34/37(c) 003 Temp.	6.0/9.0 P.H.	Avg./Max. Flow	Max. Temp. Intake
July '83	4.151	5.727	23.8/25.5	7.6/7.8	7.7/12	25.5
June '83	3.482	3.841	20.8/23.3	7.6/8/3	4.9/6.8	23.3
May '83	3.538	3.738	16.4/18.3	7.6/7.9	6.3/6.8	18.3
April '83	2.889	4.079	12.3/15.5	7.5/7.8	7.1/9.0	15.5
March '83	3.453	3.738	10.6/12.7	7.7/7.9	6.3/7.9	12.7
Feb. '83	4.022	4.623	8.7/27.7	7.5/8.6	7.5/9.0	27.7
Jan. '83	2.924	3.738	7.1/7.8	7.8/8.4	8.6/2.1	8.8
Dec. '82	3.088	3.738	10.6/12.2	7.5/8.6	8.6/12.4	12.2
Nov. '82	2.693	3.402	14.1/18.5	7.5/8.4	7.4/9.8	18.5
Oct. '82	3.911	5.769	17.9/21.1	7.6/8.1	7.6/11.9	21.1
Sept. '82	4.040	6.182	22.5/24.4	7.8/7.9	7.1/10.6	24.4
Aug. '82	2.844	4.454	24.6/27.7	7.6/8.0	12/13.9	27.7
EXCURSIONS	---	---	---	---	---	---

002/Intake Screen backwash.
003/Cooling water disc. from basic oxygen furnaces and auxiliaries.

004 Limits	Temp. 34/37	PH 6/9	Flow Avg/Max Limits	005 Temp. 34/37	P.H. 6/9	Flow Avg./Max.	P.H. Intake
July '83	23.8/25	7.5/7.6	.897/1.006	23/25	7.5/8	8.8/11.2	7.5/7.8
June '83	20.8/23	7.4/8.4	.719/.828	20/23	7.4/8.3	8.9/10.5	7.4/8.3
May '83	16.4/18.3	7.5/7.9	.790/1.035	16.4/18.3	7.6/7.9	10.6/11.9	7.8/7.9
April '83	12.3/15.5	7.4/7.7	.927/1.257	12.3/15.5	7.5/7.8	10.8/11.2	7.5/7.8
March '83	10.6/12.7	7.7/7.8	.932/1.492	10.6/12.7	7.8/7.9	10.6/15.2	7.7/8.5
Feb. '83	8.7/27.7	7.5/7.5	.827/.991	8.7/27.7	7.7/8.8	11.9/15.4	7.3/8.0
Jan. '83	7.1/7.8	7.7/8.7	.836/.943	7.1/7.8	7.8/8.6	8.3/11.2	7.7/8.2
Dec. '82	10.6/12.2	7.4/8.5	.643/.955	10.6/12.2	7.7/8.3	9.3/11.2	7.8/8.7
Nov. '82	14.1/18.5	7.5/7.9	1.298/2.852	14.1/18.5	7.5/8.6	8.5/10.5	7.6/8.8
Oct. '82	17.9/21.1	7.5.7.9	1.4/3.4	17.9/21.1	7.6/8.0	11.7/12.8	7.5/7.8
Sept. '82	22.5/24.4	7.6/8.1	1.5/2.3	22.5/24.4	7.5/8.1	12.5/14.5	7.4/7.7
Aug. '82	24.6/27.7	7.5/7.9	1.7/2.2	24.6/27.7	7.6/7.8	9.7/12.8	7.4/8.1
EXCURSIONS	---	---	---	---	---	---	---

004/Cooling water discharge from primary mill and billet mill rolling operations

005/Cooling water discharge from hot strip mill operations

DR:ds:8018C/1,sp

No. 7
Wisc. Steel (Envirodyne) IL0001660
~~Effective date of permit: 5/16/74~~
Expiration date of permit: 12/31/78
Receiving waters: Calumet River

Facility is inactive at this time. Past discharges have been to the Calumet River.

DR:ds:8018C/7,sp

No. 8
MSDGC Ca t Sewage Treatement Works aIL0028061

Municipal wastewater treatment plant with a DAF of 219 MGD and a DMF of 330 MGD. Discharge is to the Little Calumet River. Plant is served by a combined sewer system consisting of 130 miles of District interceptors and 3,213 miles of local sewers. A large number of combined sewer overflows/STP bypasses are also incorporated ino this system and discharge to various receiving streams. Outfalls 001 and 002 both discharge at the location denoted on the map. 001 is the actual outfall and 002 is the plant's surge chamber overflow. Plant improvements now under construction to expand average design flow 353 MGD and improve final effluent quality. Calumet TARP under construction to receive combined sewer overflows.

Parameter Permit Limit	Flow 220/330	P.H. 6-9	Avg. BODQ 33352	BODC 40/60	TSSQ 33352	TSSC 40/60	Max NH3 30	Fec. Coli. 400
June '82	218/286	7.2/7.7	10,900	14/20	14,600	18/25	22.4	60,000*1
July	234/284	7.5/7.7	13,300	15/15	20,400	23/25	19.2	24,000*1
Aug	213/280	7.0/7.6	15,500	20/21	22,000	28/32	21.2	60,000*1
Sept	186/246	7.3/7.5	14,900	22/29	15,900	23/34	23.6	1,200,000*1
Oct	173/237	7.0/7.7	16,400	27/31	14,700	24/28	23.4	50,000*1
Nov	214/269	7.3/7.6	9,660	12/13	12,800	16/20	22.8	160,000*1
Dec	232/247	7.2/7.6	9640	11/17	13,600	16/20	18.3	200,000*1
Jan '83	202/225	7.2/7.5	9,910	13/19	14,500	20/29	21.2	1,500,000*1
Feb	196/210	7.3/7.6	11,400	16/22	15,200	21/23	19.6	900,000*1
Mar	205/227	7.3/7.6	10,400	13/23	15,500	20/24	20.1	330,000*1
Apr	225/252	7.4/7.9	6,920	8/11	12,200	14/18	16.7	60,000*1
May	266/297	7.2/7.6	14,900	15/20	19,600	20/20	15.6	59,000*1
Jun	236/294	7.2/7.5	19,000	21/27	23,700	27/31	19.2	11,000*1
EXCURSIONS	---	---	---	---	---	---	---	12

	CL2 2/1.0	Min D.O. 5.2	Q C Arsenic	Q C Bar	Q C CAD	Max total Chrom	Q tri C Chrom 1251/1.0	Q Hex C Chrom 375/.30
June	*/1.0*1	6.2	*/*	*/*	*/*	*	*	
July	0.2/0.9	5.6	* *	*/*	*/*	*	*	
Aug	*/1.90*1	4.3*1	*	*	*	*	*	30.7/.04
Sept	*/1.10*1	5.5	*	*	*	.02	16.6/.02	16.6/.02
Oct	.1/.7*1	5.4	*	*	*	.03	26.4/.03	26.4/.03
Nov	.2/1.0	5.4	*	*	*	*	*	* *
Dec	.2/.5	5.2	*	*	*	*	*	*
Jan '83	*/.2*1	4.3*1	*	*	*	.02	14.9/.02	14.9/.02
Feb	*/1.0	6.1	*	*	*	*	*	*
Mar	.4/.9	5.9	*	*	*	.03	25.3/.03	25.3/.03
Apr	.1/1.0*1	6.8	*	*	*	.03	27.1/.03	27.1/.03
May	.4/1.0	5.3	*	*	*	*	*	*
June	.2/1.0	5.8	*	*	*	.03	24.4/.03	24.4/.03
EXCURSIONS	6	2	---	---	---	---	---	---

See page (2 of 2)

DR:ds:8018C/11,sp

MSDGC Cal... (1 of 2)

[illegible]

	Q/M C Copper 12/51/1.0	Q C CN 575/.460	Q C Flor 18760/15	Q Total C Iron 2752/2.2	Q Dis C Iron 625/0.5	Q Dis C Lead 225/.18	Q C Mang. 1251/1.00	Merc. 2.2/.0018
June	29/.03	91.1/.122	1050/1.27	543/0.7	77.2/0.1	*/*	137/.16	40/.0004
July	20.3/.02	48.2/.058	1170/1.19	633.0.6	101/0.1	*	122/.14	.405/.0004
Aug	25.5/.03	30.5/.047	914/1.19	702/.09	234/0.3	*	93.6/.12	.14/.002
Sept	51.2/.06	37.9/.057	931/1.278	512/0.6	67.2/0.1	*	92.5/.11	.076/.0001
Oct	26.4/.04	49.3/.056	892/1.19	1140/1.3	88/0.1	*	96.8μ.16	.14/0.2
Nov	20./.02	115/.165	880/1.15	417/.6	99/0.1	*	111/.12	.226/.0004
Dec	*	149/.18	1040/1.26	680/.08	89.5/0.1	*	116/.14	.327/.0004
Jan '83	15.2/.02	66.1/.086	1090/1.3	478/0.7	204/0.3	*	112/.14	.483/.0006
Feb	22.1/.03	34.4/.045	906/1.22	685/0.9	304/0.4	*	95.6/.13	.153/.0002
Mar	16.1/.02	69/.089	1170/1.45	395/0.5	80.2/0.1	16.1/.02	92.8/.11	1.2/.0014
Apr	16.6/.02	192/.24	850/.94	520./0.6	181/0.2	25.5/.03	1081.12	.091.001
May	30.9/.03	65/.068	1030/1.0	662/0.7	189/0.2	*	163/.15	.111/.0001
June	20.7/.02	153/.195	107/1.19	779/0.9	318/0.4	17.4/.02	136/.14	.111/.0001
EXCURSIONS:	---	---	---	---	---	---	---	---

	Q C Nic 1251/1.0	Q C Oil 77543/.62	Q C Phen. 375/.300	Q C Scl 1251/1.0	Q C Silver 125/.1	Q C Zinc 1251/.1	003 BOD	TSS	Flow
June	*/*	6060/8	68.2/.090	*/*	*/*	254/.34	68	142	39
July	*	8420/9	92.7/.109	*	*	694/0.7			
Aug	*	9030/13	121/.132	*	*	822/.95			
Sept	*	8370/4	83.7/.126	*	*	658/.77			
Oct	*	14,100/16	33.1/.049	*	*	521/.85			
Nov	*	7370/8	26.7/.032	*	*	170/.22			
Dec	*	8050/9	89.7/.106	*	*	248/0.3			
Jan '83	*	18,300/27	8.88/.013	*	*	110/0.16			
Feb	*	24,700/34	7.8/.011	*	*	162/.23			
Mar	*	7490/9	10.5/.011	*	*	124/.13			
Apr	*	8920/9	26.9/.025	*	*	236/.25			
May	*	8920/9	26.9/.025	*	*	236/.25			
June	*	8700/10	14.5/.014	*	*	582/.63			
EXCURSIONS:	--	---	---	---	---	---	---	---	---

*Below detectable limits
*[1]NPDES Excursions

DR:ds:8018C/12,sp

No. 9
Wolf Lake minals, Inc. Hammond, Ind.

An industrial center/tank farm which is located in Indiana but discharges storm water to Wolf Lake in Illinois. Facility is currently in litigation for allegedly discharging contaminated stormwater into waters of the States of Illinois and Indiana.

No Illinois NPDES permit exists. Sample results obtained from the Agency's Records Unit are as follows:

- 5/14/82
  From run-off water north end westside of plant facility of W.L.T. sampled by MSDGC.

  BOD 26, SS 46, D.S. 596, C.O.D. 161, NH_3 (free) 0.2, CN .024, Phen. 60 ppb, TOC 44, P.H. 7.1

- March 25, 1982: Sample(s) by IEPA: (selected) discharge pipe

  BOD 42/COD 360/Oil 96/TSS 33/NH_3 1.2.1

- Run-off to Lake:
  BOD 170/COD 1840/Oil 700/TSS 1100/NH_3 19.0/

OR:ds:8018C/9,sp

No. 10
U.S. Steel (South Works) IL0002691
~~Effective date of permit: 10/2/82~~
Expiration date of permit: 8/31/87

Eight permitted outfalls of which seven are discharging to Lake Michigan and one to the Calumet River via the facility's south slip. Lone discharge to the Calumet River is currently out of service (NCCW).

Discharge Number and Name:	Receiving Waters:	NPDES Limits:
001: Noncontact cooling water from #5 Power Station condenser	Lake Michigan	Fe 2/4, ZN 1/2, PH 6/9, TSS 15/30*1
002: Noncontact cooling water from #8, 11, and 12 blast furnaces and engine room compressors	Lake Michigan	PH 6/9, TSS 15/30*1, temp.
003: Noncontact cooling water from electric furnace, roof drains and storm water	Lake Michigan via North Slip	TSS 15/30*1, F.C. 400, Fe 2/4, Mag. 1/2
004: Noncontact cooling water from the basic oxygen process, and continuous caster and gas cooling tower water and roof drains and storm runoff	Lake Michigan via North Slip	Same as 002 above
005A: Clarifier overflow to recycle system		PH 6/6, TSS 15/30, O&G 15, 30, Fe rept, ZN .45/1.35
005: Overflow from surge basins	Lake Michigan via North Slip	Report same as 005A and ZN, manganese
006: Process water overflow and noncontact cooling water	Calumet River via South Slip	Report same as 005A and ZN, Manganese
008: Intake screen backwash water	Lake Michigan	Report flow

Permittee has had no effluent excursions in the last year.

DR:ds:8018C/10

No. 11
Continen   Grain Co. IL0037401
Effective date of permit: 11/4/79
Expiration date of permit: 7/31/84
Receiving waters: Calumet River

Treated sanitary waste to the Calumet River.

DAF = 0.005 MGD

001/Domestic Waste Discharge

001 Limits:	Flow	BOD 30/45	TSS 30/45	F.C. 400	P.H. 6/9
July '81	.003	4/16	6/11	---*1	7/7.3
Aug '81	.003	1/2	6/10	6000*2	6.7/7.4
Sept '81	.003	3/10	14/38	700*2	7.0/7.4
Oct '81	.003	1/1	4/7	700*2	7.0/7.4
Dec '81	.003	1/2	5/7	---*1	7.0/7.5
Nov '81	.003	1/2	6/16	1500*2	7.2/7.8
EXCURSIONS	---	---	---	4	---

*1 Not reported

*2 excursions(s)

OR:ds:8018C/4,sp

No. 12
Car Carriers, Inc. IL0002721
Effective date of permit: 6/6/75
Expiration date of permit: 7/31/79
Receiving waters: Grand Calumet River

Treated sanitary waste to the Grand Calumet River. DAF 0.004 MGD. NPDES Permit expired on July 31, 1979; a renewal had not been submitted as of February 28, 1983.

No discharge monitoring reports could be found. The latest inspection was August 11, '82. A sample was taken from a manhole south of plant. Those results were:

(grab)	P.H.	BOD	TSS	Oil	Res. on Evap.	NH3	$NO_3 + NO_2$	F.C.
	12.1*1	<1.5	22*1	2	1046	2.9	1.4	<10

NPDES Permit limits: *2

P.H.	BOD	TSS	O&G	F.C.
6/9	4/10	5/13	15 (Max	400

*1 excursions(s) *2 If granted an exemption BOD/TSS limits could be

	Daily Average	Daily Max
TSS	10	30
BOD	12	25

DR:ds:8018C/8,sp

APPENDIX F

Appendix F

The information for Illinois air pollution sources is contained in the IEPA data bank called the Total Air System (TAS). The TAS was established to meet a variety of needs: air quality analyses, permit reviews, setting field investigation and enforcement priorities, and special studies.

Any plant for which an air pollution permit is required is on file in the TAS. Information about a plant is organized into three basic categories: (1) information about an entire plant or facility; (2) information about a specific operation within the facility; or (3) information about an emissions source, control system or exhaust point within an operation.

The information concerning an entire facility found in the TAS includes:

- Plant name, address, city, zip code;
- Company name, address, city, state, and zip code;
- Various state, county, city, and major metropolitan area codes;
- Ownership code, plant Standard Industrial Classification (SIC), number of employees, and plant Universal Traverse Mercator (UTM) coordinates;
- Compliance status and date, plant inspection date and engineer's initials, warning letter date, and date plant ceased operation;
- Date permit received, permit expiration date, and analysis engineer's initials;
- Identity of owner and person submitting the application, and number of times processed;
- Process weight rate, operating rate, hours of operation (all maximum and average) and percent throughput by quarter;
- Heat input, percent space heat, percent sulfur and ash, and heat content;
- Uncontrolled and allowable emission rates, estimation method, and limiting rule (maximum and average) for each of the five criteria contaminants;
- Control equipment name, and control equipment codes and overall efficiency for each of the five criteria contaminants; and
- Stack height (for an effective plume height), diameter, exhaust rate, temperature, and stack UTM coordinates.

The emissions for the point source facilities in the study area are shown in the printout following this section. The various data items listed are as follows: (1) a written number identifies a plant as a major emitter (100 tons per year) of a pollutant; (2) the "Reg" and "ID" are Agency identifiers and have no particular relevance to this study; (3) the term "ST" is the status of the facility in regard to compliance with air pollution regulations:

1 = in compliance	4 = unknown
2 = not in compliance	5 = minor violation
3 = has a variance	

(4) the term "Class" is the classification of the facility with respect to its potential to emit 100 tons per year (TPY) of any pollutant if its air pollution control devices were not operating:

Class A = has the potential to emit 100 TPY of any single pollutant
Class B = does not have this potential; and

(5) the term "SIC" refers to the facility's Standard Industrial Classification code which identifies the primary business of the facility. A table showing the major groups of SIC codes is incorporated as Appendix G of this report. The name and address of the facility is given next and is followed by the emissions of each pollutant in tons per year. At the end of the address line following the zip code are two sets of numbers; starting with the number four, which have no consequence in this study.

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
DIVISION OF AIR POLLUTION CONTROL
TOTAL AIR SYSTEM
SOUTH CHICAGO ENV. POLL. STUDY

	REG	ID	SIC	SI	CLASS	NAME	PART	SO2	NOX	HC	CO
1	104	031600ASE	3251	1	A	AMERICAN BRICK CO	295.6	1,570.7	5.3	.5	1.0
						1400 E 138TH ST	CHICAGO		60627	4453	46102
2	105	031600EGV	4953	2	A	AMERICAN INCINERATION INC. (ALBURN)	91.6	.0	.0	1,300.0	.0
						2200 E 119 STR	CHICAGO		60617	4523	46137
3	102	031039AAA	2821	1	A	ASHLAND CHEMICAL COMPANY	142.0	84.6	48.4	16.8	1.7
						142 ST & PAXTON AVE	CALUMET CITY		62501	4521	46096
4	102	031069AAI	3221	1	A	BALL GLASS CONTAINERS INC	105.2	441.0	93.7	12.6	.0
						138 ST & COTTAGE GROVE	DOLTON		60419	4500	46102
	105	031600DVV	1473	5	A	CAMETCO INC.	2.5	.0	1.5	.0	.0
						3200 EAST 95TH STREET	CHICAGO		60617	4545	46187
5	105	031600ANE	5153	1	A	CARGILL INC - COMMODITY MARKETING DIV	454.1	181.0	74.5	26.2	6.4
						122 & TORRENCE	CHICAGO		60617	4535	46133
	105	031600CGI	2951	2	A	CHICAGO PAVING AND CONSTRUCTION CO	3.5	.1	16.9	.3	1.6
						12701 S DOTY AVE	CHICAGO		60633	4497	46138
6	105	031600DDQ	3295	2	A	CINDERS INC	135.3	.0	.0	.0	.0
						12009 AVENUE O	CHICAGO		60617	4550	46128
7	105	031600AMJ	4912	1	A	COM ED --CALUMET PEAKING UNITS	67.5	121.3	1,916.4	32.3	119.7
						3200 E. 100TH ST.	CHICAGO		60617	4546	46181
	105	031600AMD	5153	1	A	CONTINENTAL GRAIN CO-ELEVATOR B	64.9	.0	.0	.0	.0
						11700 S TORRENCE AVE	CHICAGO		60617	4534	46144
	105	031600AOE	5153	1	A	CONTINENTAL GRAIN CO-ELEVATOR C	18.6	.0	.0	.0	.0
						127TH ST & CALUMET	CHICAGO		60633	4534	46132
8	102	031039AAC	2821	1	A	COSDEN OIL & CHEM CO - CALUMET CITY PLT	62.7	.0	202.2	17.2	8.1
						142ND & PAXTON	CALUMET		60409	4520	46096
	105	031600BUG	2899	1	A	DOMTAR INDUSTRIES INC-SIFTO SALT DIV	12.9	.0	.0	.0	.0
						9267 SO HARBOR AVE	CHICAGO		60617	4548	46195
	105	031600DPK	5039	2	A	DUNDEE CEMENT COMPANY	1.2	.0	.0	.0	.0
						3221 EAST 95TH STREET	CHICAGO		60617	4545	46187
	102	031258AAG	2865	1	A	FARCO OIL & CHEM DIV HANDSCHY INDUSTRIES	.0	.0	.9	16.8	.0
						13601 S. ASHLAND AVENUE	RIVERDALE		60627	4450	46106
9	105	031600AAR	3711	5	A	FORD MOTOR COMPANY	19.8	41.7	33.3	2,082.1	6.7
						12600 TORRENCE AVE	CHICAGO		60633	4533	46125
	104	031600EFR	3297	5	A	FOSECO, INC.-CHICAGO PLANT	6.4	.0	8.0	23.0	.0
						10823 SOUTH LANGLEY AVE	CHICAGO		60628	4416	46155

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
DIVISION OF AIR POLLUTION CONTROL
TOTAL AIR SYSTEM
SOUTH CHICAGO ENV. POLL. STUDY

	REG	ID	SIC	ST	CLASS	NAME	PART	SO2	NOX		HC	CO
10	105	031600BEI	2041	1	A	GENERAL MILLS INC	263.4	.0	54.1		.9	5.0
						10459 MUSKEGON AVE	CHICAGO		60617	4538	46171	
11	104	031600AAW	3743	1	A	GENERAL MOTORS - ELECTRO-MOTIVE DIV PLT2	2.8	6.4	33.5		171.1	.7
						900 E 103RD STREET	CHICAGO		60628	4499	46171	
12	105	031600AFV	2999	1	A	GREAT LAKES CARBON CORP	30.1	1,642.8	.0		.0	.0
						2701 E 114TH ST	CHICAGO		60617	4536	46150	
13	105	031600BUN	3295	2	A	HECKETT ENGINEERING	109.2	.0	.0		.0	.0
						112TH & TORRENCE	CHICAGO		60617			
14	105	031600EFV	3295	2	A	HECKETT ENGINEERING CO DIV OF HARSCO COR	109.1	.0	.0		.0	.0
						12315 S BURLEY AVE	CHICAGO		60633	4547	46132	
	104	031600ADL	3341	2	A	IMPERIAL SMELTING CORPORATION	5.8	.0	.0		.0	.0
						1031 E 103RD STREET	CHICAGO		60628	4460	46171	
	105	031600AIE	5153	1	A	INDIANA GRAIN CO-OPERATIVE	10.6	.0	.0		.0	.0
						12700 S.BUTLER DRIVE	CHICAGO		60633	4535	46130	
15	105	031600AMA	3312	2	A	INTERLAKE - CHICAGO BLAST FURNACE PLANT	1,052.9	108.5	5,283.5		86.9	602.3
						10730 BURLEY AVE	CHICAGO		60617	4544	46163	
16	105	031600BFB	3312	1	A	INTERLAKE, INC - CHICAGO COKE PLANT	661.3	1,907.1	14.4		1,773.1	317.8
						11236 SOUTH TORRENCE AVE	CHICAGO		60617	4533	46152	
17	102	031258AAI	3312	2	A	INTERLAKE, INC. RIVERDALE PLANT	2,394.2	585.2	1,302.2		41.0	5,408.8
						13500 PERRY AVE.	RIVERDALE		60627	4479	46115	
	102	031258AAK	5039	1	A	LOUISVILLE CEMENT COMPANY	6.2	.0	.0		.0	.0
						1400 W 134TH STREET	RIVERDALE		60627	4459	46110	
	104	031600AUI	2641	1	A	LUDLUM SPECIALTY PAPERS-FINE PAPER DIV.	.0	.0	.0		73.2	.0
						11234 S FORRESTVILLE AVE	CHICAGO		60628	4493	46153	
18	105	031600ADY	3274	2	A	MARBLEHEAD LIME CO	476.1	2,119.7	.0		.0	.0
						3245 E 103RD STREET	CHICAGO		60617	4530	46173	
19	104	031600CKM	2645	1	A	MEAD PACKAGING	7.5	.0	.0		286.5	.0
						9540 SO DORCHESTER AVE	CHICAGO		60628	4510	46187	
	105	031600BUN	4463	2	A	MEDUSA CORP	1.5	.0	.0		.0	.0
						12101 S DOTY AVE	CHICAGO		60633			
	105	031600AED	4463	2	A	MISSISSIPPI LIME CO	9.3	.0	.0		.0	.0
						12200 SOUTH STONEY AVE	CHICAGO		60633	4500	46134	
	105	031600CKP	3297	1	A	NALCO CHEMICAL CO - METAL INDUSTRY CHEM	1.4	.4	2.1		10.4	.4
						9165 SO HARBOR	CHICAGO		60617	4550	46196	

DIVISION OF AIR POLLUTION CONTROL
TOTAL AIR SYSTEM
SOUTH CHICAGO ENV. POLL. STUDY

	REG	ID	SIC	ST	CLASS	NAME	PART	SO2	NOX	HC	CO
20	105	031600ALC	2819	5	A	PVS CHEMICALS INC	13.6	141.6	30.8	.4	3.0
						12260 S CARONDOLET AVE	CHICAGO		60633	4542	46136
21	105	031600AMC	3312	2	A	REPUBLIC STEEL CORPORATION	2,578.5	1,960.5	1,962.2	407.5	9,381.8
						11600 SOUTH BURLEY AVENUE	CHICAGO		60617	4546	46142
	105	031600AGZ	4953	1	A	SCA CHEMICAL SERVICES INC	43.9	.0	46.4	.0	1.3
						11700 STONEY ISLAND	CHICAGO		60617	4522	46145
22	105	031600BIY	4226	1	A	SEATANK INC.	7.0	.9	89.8	404.6	13.1
						12200 STONEY ISLAND AVE	CHICAGO		60633	4530	46149
23	104	031600AHJ	2851	1	A	SHERWIN-WILLIAMS CO	773.8	331.1	144.1	1,152.1	11.4
						11541 S. CHAMPLAIN AVE.	CHICAGO		60628	4494	46148
	104	031600AQW	2874	1	A	STAUFFER CHEM - WATERWAY PLANT	35.1	.0	2.4	.0	.6
						612 EAST 138 TH	CHICAGO		60627	4469	46102
24	105	031600ALZ	3312	2	A	U S STEEL - SOUTH WORKS	2,583.7	259.3	4,084.9	21.0	26,565.6
						3426 E. 89TH ST.	CHICAGO		60617	4552	46206
	105	031600BFD	3479	2	A	VALLEY MOLD & IRON	33.1	5.8	13.1	.0	.0
						108TH & CALUMET RIVER STS	CHICAGO		60617	4548	46166
	102	031069AAP	3551	1	B	A M MANUFACTURING CO	.0	.0	.0	.0	.0
						14152 IRVING AVE	DOLTON		60419	4497	46094
	104	031600EVS	2013	1	B	AGAR FOOD PRODUCTS COMPANY	.3	.0	2.8	44.5	.3
						700 EAST 107TH STREET	CHICAGO		60628	4496	46165
	105	031600EKT	2999	4	B	AGLOMET(FLUE DUST HDLG-REPUBLIC STEEL)	3.0	.0	.0	.0	.0
						12345 S. CARONDOLET AVE.	CHICAGO		60617	4543	46130
	102	031069AAW	3714	1	B	AGRI-CHAIN PRODUCTS INC	5.6	.0	36.1	29.9	4.9
						13943 PARK AVENUE	DOLTON		60419	4494	46098
	102	031069ARF		1	B	AIR POLLUTION CONTROL CORP	.0	.0	.1	.0	.0
						14901 SO GREENWOOD AVE	DOLTON		60419		
	104	031600BKY	2899		B	AIR PRODUCTS & CHEMICALS	.0	.0	.0	.0	.0
						12721 SOUTH WENTWORTH AVE	CHICAGO		60628	4480	46122
	104	031600ARY	2951	1	B	AMERICAN ASPHALT PAVING CO	.0	.0	.0	.0	.0
						700 E 120TH STREET	CHICAGO		60628	4468	46137
	104	031600CTA	3471		B	AMERICAN CLYBOURN FINISHING	.0	.0	.0	.0	.0
						11730 SO FRONT AVE	CHICAGO		60628	4488	46142
	104	031600ALV	7216		B	AMERICAN IDEAL CLEANING CO	.0	.0	.0	.0	.0
						10341 SO. MICHIGAN AVE	CHICAGO		60628	4484	46171

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
DIVISION OF AIR POLLUTION CONTROL
TOTAL AIR SYSTEM
SOUTH CHICAGO ENV. POLL. STUDY

REG	ID	SIC	SI	CLASS	NAME	PART	SO2	NOX	HC	CO
105	031600BGL	3731		B	AMERICAN SHIP BLDG	.7	10.3	4.2	.5	.5
					101ST ST & CALUMET RIVER	CHICAGO		60617	4551	46178
102	031039AHK	2899	1	B	AMERICAN THERMOPLASTICS CORPORATION	.1	.0	.0	.0	.0
					142ND AND PAXTON ST	CALUMET CITY		60409	4527	46093
102	031258AAA	3361	1	B	ATHERTON FOUNDRY PRODUCTS INC	.1	.0	.0	.0	.0
					13000 S HALSTED ST	RIVERDALE		60627		
104	031600CSA	3444		B	B L MARDER CO	.3	2.7	1.3	.0	.0
					9551 COTTAGE GROVE AVE	CHICAGO		60628	4497	46188
102	031258AAJ	4013		B	BALTIMORE & OHIO CHICAGO TERMINAL	.6	12.1	23.9	1.3	.6
					733 W 136TH ST	RIVERDALE		60627	4466	46106
105	031600ERB	8211		B	BD ED ADDAMS SCHOOL	.0	.0	.0	.0	.0
					10810 S AVE H	CHICAGO		60617	4556	46162
104	031600EGE	8211		B	BD ED BENNETT SCHOOL	.0	.0	.0	.0	.0
					10115 SO PRAIRIE ST	CHICAGO		60628	4486	46175
105	031600ERD	8211		B	BD ED BOWEN HIGH SCHOOL	.0	.0	.0	.0	.0
					2710 E 89 ST	CHICAGO		60617	4536	46201
104	031600EFT	8211		B	BD ED BRENAN SCHOOL	.0	.0	.0	.0	.0
					11411 S EGGLESTON	CHICAGO		60628	4473	46719
104	031600ESJ	8211		B	BD ED CARVER HIGH SCHOOL	.0	.0	.0	.0	.0
					801 E. 133RD PLACE	CHICAGO		60627	4499	46111
104	031600EXW	8211		B	BD ED CARVER SCHOOL	.1	.0	.0	.0	.0
					909 E 132ND ST	CHICAGO		60627	4498	46115
105	031600ERI	8211		B	BD ED COLES SCHOOL	.0	.0	.0	.0	.0
					8440 S PHILLIPS AVE	CHICAGO		60617	4529	46209
104	031600EQZ	8211		B	BD ED CURTIS SCHOOL	.0	.0	.0	.0	.0
					32 E 115 ST	CHICAGO		60628		
105	031600ERY	8211		B	BD ED GALLISTEEL SCHOOL	.0	.0	.0	.0	.0
					10347 S EWING AVE	CHICAGO		60617	4554	46171
104	031600ERA	8211		B	BD ED KOHN SCHOOL	.0	.0	.0	.0	.0
					10414 S STATE ST	CHICAGO		60628	4480	46169
104	031600DVE	8211		B	BD ED LANGSTON HUGHES SCHOOL	.4	.1	.2	.2	.6
					226 WEST 104TH STREET	CHICAGO		60628	4474	46171
105	031600EFS	8211		B	BD ED MANN SCHOOL	.0	.0	.0	.0	.0
					8050 S CHAPPEL	CHICAGO		60617	4521	46216

DIVISION OF AIR POLLUTION CONTROL
TOTAL AIR SYSTEM
SOUTH CHICAGO ENV. POLL. STUDY

REG	ID	SIC	ST	CLASS	NAME	PART	SO2	NOX	HC	CO
104	031600ERC	8211		8	BD ED POE SCHOOL	.0	.0	.0	.0	.0
					10538 S LANGLEY AVE	CHICAGO		60628	4495	46166
104	031600ESS	8211		8	BD ED PULLMAN SCHOOL	.0	.0	.0	.0	.0
					11311 S FORREST VILLE AVE	CHICAGO		60628	4493	46151
104	031600GP	8211		8	BD ED SCANLAN SCHOOL	.3	.0	.0	.0	.0
					11725 S PERRY AVE	CHICAGO		60628		
105	031600EM	8211		8	BD ED TAYLOR SCHOOL	.0	.0	.0	.0	.0
					99TH & AVE H	CHICAGO		60617	4556	46180
104	031600DSV	8211		8	BD ED THEOPILUS SCHMID SCHOOL	.0	.0	.0	.0	.0
					9755 SOUTH GREENWOOD AVE	CHICAGO		60628		
105	031600DFI	8211		8	BD ED WILLIAM K SULLIVAN SCHOOL	.0	.0	.0	.0	.0
					8255 S. HOUSTON	CHICAGO		60617		
102	031069ABI	2511	1	8	BEACH BROOK FURNITURE	.0	.0	.0	.0	.0
					14825 SOUTH DREXEL	DOLTON		60419		
102	031069ARE			8	BERGER-VANDENBERG SCHOOL	.2	.0	.0	.0	.2
					14833 AVALON	DOLTON		60419		
104	031600ASL	3255	1	8	BLACK PRODUCTS CO	3.1	.0	.0	3.8	.0
					13513 SO CALUMET AVE	CHICAGO		60627	4487	46110
102	031258AAC	3547	1	8	BONELL MANUFACTURING CO	.1	.4	.0	1.1	.0
					13521 S HALSTED ST	RIVERDALE		60627	4466	46109
102	031069AAH	2819	1	8	BREDDO FOOD PROD CORP DIVISION I T C	.3	.0	8.3	.1	.4
					14622 LAKESIDE	DOLTON		60419	4490	46084
102	031039AAT	2011		8	BROWN PACKING COMPANY	.0	.0	.0	.0	.0
					15800 GREENWOOD ROAD	CALUMET CITY		60409		
102	031039AHS	7216		8	BURNHAM CLEANERS	.0	.0	.0	11.7	.0
					224 GOLD COAST LANE	CALUMET CITY		60409		
102	031036AAD	3315	1	8	BURNHAM STEEL & WIRE	.0	.0	.0	.0	.0
					14146 SO MACKINAW	BURNHAM		60633		
105	031600CHX	2511	5	3	BUTLER SPECIALTY	6.4	.0	1.1	62.6	.0
					8200 S. CHICAGO AVE.	CHICAGO		60617	4519	46215
102	031039AAY		1	8	C I D LANDFILL	.0	.0	.0	.0	.0
					138TH STREET & CALUMET EX	CALUMET CITY		60409		
102	031258AAZ		4	8	CALUMET ARMATURE & ELECTRIC CO	.0	.0	.1	1.6	.0
					1050 W 134TH ST	RIVERDALE		60627		

DIVISION OF AIR POLLUTION CONTROL
TOTAL AIR SYSTEM
SOUTH CHICAGO ENV. POLL. STUDY

REG	ID	SIC	ST	CLASS	NAME	PART	SO2	NOX		HC		CO
102	031069AAE	3362	1	B	CALUMET BRASS FOUNDRY INC	2.7	.0	.0		.0		.0
					14610 LAKESIDE	DOLTON		60419	4491		46085	
102	031039AAZ	3271	2	B	CALUMET READY-MIX	.1	.0	.0		.0		.0
					BURNHAM AVE & STATE STR	CALUMET CITY		60409				
102	031036AAA	2992	1	B	CALUMET REFINING CO	.4	.0	6.0		.0		.4
					13921 MACKINAW AVE	BURNHAM		60633				
104	031600DIA	6513		B	CHA-ALTGELD GARDENS	.0	.0	.0		.0		.0
					VARIOUS	CHICAGO		60627				
104	031600DJA	6513		B	CHA-PHILIP MURRAY HOMES ILL 2-11	.0	.0	.0		.0		.0
					660 E 133RD ST	CHICAGO		60627				
105	031600CLU	6513	2	B	CHA-TRUMBULL PARK HOMES	3.0	27.3	18.6		.4		1.7
					NUMERONS	CHICAGO		60617	4530		46164	
105	031600BTE		1	B	CHEM-CLEAR	.0	.0	.0		.0		.0
					11800 SOUTH STONEY ISLAND	CHICAGO		60617				
102	031258ABA	1629		B	CHEMICAL WASTE MANAGEMENT-TECH CENTER	.0	.0	.0		.0		.0
					150 W 137TH ST	RIVERDALE		60627				
105	031600CST	4013		B	CHICAGO ROCK ISLAND PACIFIC RAILROAD CO	.0	.0	.0		.0		.0
					95TH ST AND ESSEX AVE	CHICAGO		60617	4531		46188	
105	031600CSS	4013		B	CHICAGO ROCK ISLAND PACIFIC RAILROAD CO	.0	.0	.0		.0		.0
					95TH AND OGLESBY ST	CHICAGO		60617	4527		46188	
105	031600CSR	4013		B	CHICAGO ROCK ISLAND PACIFIC RAILROAD CO	.0	.0	.0		.0		.0
					95TH AND COLFAX AVE	CHICAGO		60617	4533		46188	
105	031600DTW	2092	1	B	CHICAGO SHORTENING CORP	1.7	11.2	22.4		.4		3.2
					9101 S BALTIMORE AVENUE	CHICAGO		60617	4543		46196	
104	031600DLX	8221	1	B	CHICAGO STATE UNIVERSITY	3.5	.0	14.0		.0		3.5
					NINETY-FIFTH ST KINGDRIVE	CHICAGO		60628	4489		46188	
105	031600ASU	3315	1	B	CHICAGO STEEL & WIRE - DIV KEYSTONE	1.8	.0	.0		.0		.0
					10257 S TORRENCE AVE	CHICAGO		60617	4461		46191	
105	031600ENA	3547	2	B	CHICAGO STEEL AND PICKLING CO	.0	.0	.0		.0		.0
					12500 SO STONY ISLAND	CHICAGO		60633				
104	031600CFH	4941	1	B	CHICAGO WATER DEPT - ROSELAND PUMPING ST	3.9	.0	49.4		1.0		6.4
					351 W 104TH ST	CHICAGO		60628	4474		46170	
102	031036AAF		2	B	CITY OF BURNHAM	.0	.0	.0		.0		.0
					CITY HALL	BURNHAM		60633				

DIVISION OF AIR POLLUTION CONTROL
TOTAL AIR SYSTEM
SOUTH CHICAGO ENV. POLL. STUDY

REG	ID	SIC	SI	CLASS	NAME	PART	SO2	NOX		HC		CO
105	031600ECU	2643	1	B	CLEAR-VIEW PLASTICS INC	.0	.0	.1		.0		.0
					1650 E 95 STR	CHICAGO		60617				
102	031069AAF	2631	1	B	CONTAINER CORPORATION OF AMERICA	.8	.0	.0		.0		.0
					301 E 144 STREET	DOLTON		60491	4490		46089	
104	031600EKB	5093	1	B	CRYOGENICS INC	.0	.0	.0		.0		.0
					11900 SOUTH COTTAGE GROVE	CHICAGO		60628				
105	031600EZY		2	B	DEEMSTER BOER	.0	.0	.0		.0		.0
					3200 E 106TH STREET	CHICAGO		60617				
105	031600DDL	7216		B	DELUXE CLEANERS	.0	.0	.0		.0		.0
					3046 E 92ND ST	CHICAGO		60617	4420		46193	
102	031039AAN	2833	5	B	DYNAGEL INC	.8	.0	32.0		1.7		2.5
					WENTWORTH AND PLUMMER	CALUMET CITY ILLINOIS		60409	4554		46080	
105	031600FAH	7216		B	ELLIS CLEANERS	.0	.0	.0		.0		.0
					3026 EAST 91ST STREET	CHICAGO		60617				
105	031600BWF	4953	2	B	ELM TREE FOODS	.0	.0	.0		.0		.0
					11207 EWING AVENUE	CHICAGO		60617				
102	031039AAF	2819	1	B	ESTECH GENERAL CHEMICALS CORP	.0	.0	.0		.0		.0
					150 MARBLE ST	CALUMET CITY		60409	4570		46086	
104	031600ETR	3441		B	FABRICATING AND WELDING CORP	.0	.0	.0		.0		.0
					12206 S. HALSTED ST.	CHICAGO		60628	4467		46719	
105	031600AWJ	2083	5	B	FALSTAFF BREWING COMPANY	.0	.0	.0		.0		.0
					103RD ST & INDIANAPLS BLV	CHICAGO		60617	4558		46172	
102	031258AAY	3544		B	FEM TOOL & DIE CO	.0	.0	.0		.0		.0
					13417 S HALSTED ST	RIVERDALE		60627				
104	031600CYM	7216		B	FLAIR CLEANERS	.0	.0	.0		17.5		.0
					11518 SO MICHIGAN	CHICAGO		60628				
105	031600ERU	3462		B	FORGED TOOTH GEAR CO	.1	.0	.0		.0		.0
					10241 SO COMMERCIAL	CHGO		60617	4540		46175	
102	031258AAE	2499	1	B	FRANK MILLER AND SONS INC	.1	.0	1.5		.0		.0
					13831 SOUTH EMERALD AVE	RIVERDALE		60627	4466		46100	
104	031600BMP	3563		B	FRANKS PAIL & DRUM SERVICE	.1	.0	.0		16.8		.0
					545 W 119TH ST	CHICAGO		60628	4473		46139	
102	031258AAX	5093	5	B	FRITZ ENTERPRISES INC	26.4	.0	.0		.0		.0
					1200 WEST 138 STREET	RIVERDALE		60627	4459		46102	

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
DIVISION OF AIR POLLUTION CONTROL
TOTAL AIR SYSTEM
SOUTH CHICAGO ENV. POLL. STUDY

REG	ID	SIC	SI	CLASS	NAME	PART	SO2	NOX	HC	CO
105	031600BTZ		2	B	GALLITEL SCHOOL	.0	.0	.0	.0	.0
					10347 SO EWING	CHICAGO		60617		
104	031600EPN	3281		B	GALLOY & VAN ETTEN, INC	.0	.0	.0	.0	.0
					11756 S HALSTED ST	CHICAGO		60628	4382	46273
102	031066AAH	3317	1	B	GENERAL TUBE CORP	39.6	.0	.0	.0	.0
					139TH AND SEELEY BOX27036	DIXMOOR		60627	4440	46096
102	031039AHQ		3	B	GETTY SYNTHETIC FUELS INC	.0	.0	33.1	13.9	19.6
					P O BOX 1306	CALUMET CITY		60409	4540	46085
102	031069ABK	2911		B	GETTY SYNTHETIC FUELS INC	.0	.0	.0	.0	.0
					138TH ST & COTTAGE GROVE	DOLTON		60419		
102	031258AAS	3295	2	B	HECKETT ENGINEERING (HARSCO) PLANT 27	11.6	.0	.0	.0	.0
					135TH ST AND PERRY AVENUE	RIVERDALE, IL		60627	4481	46120
105	031600CHV	3441		B	HIBBEN & CO	.0	.0	.0	.0	.0
					9376 EWING AVE	CHICAGO		60617	4939	46221
102	031036AAD	3357	1	B	HOFFMAN INSULATION MFG CO.	.1	.0	.0	.0	.0
					MARTHA & EXCHANGE AVE	BURNHAM		60419		
105	031600BAS	2291	1	B	IKO MANUFACTURING INC.	.0	.0	.0	.0	.0
					2648 EAST 126 STREET	CHICAGO		60633	4536	46128
105	031600BSU		1	B	ILLINOIS SCRAP IND INC	.0	.0	.0	.0	.0
					9331 S EWING	CHICAGO		60617		
105	031600ADQ	3295	1	B	ILLINOIS SLAG AND BALLAST CO	1.6	.0	.0	.0	.0
					2817 E 99TH STREET	CHICAGO		60617	4537	46180
104	031600ASR	3341	1	B	INLAND METALS REFINING COMPANY	.0	.0	.0	.0	.0
					651 E. 119TH ST	CHICAGO		60628	4495	46139
105	031600CKL	3295	2	B	INTERNATIONAL MILL SERVICE INC	.0	.0	.0	.0	.0
					BOX 17105	CHICAGO		60617	4547	46201
102	031258AAT	4463	1	B	INTERNATIONAL MINERALS & CHEMICAL CO	16.9	.0	.0	.0	.0
					130TH & INDIANA	RIVERDALE		60627	4482	46112
105	031600AUB	3341	1	B	INTERSTATE SMELTING & REFINING CO	.0	.0	.0	.0	.0
					9651 S TORRENCE	CHICAGO		60617	4534	46187
104	031600AVM	2099	1	B	JAYS FOODS INC	47.0	.0	.0	.0	.0
					825 E 99TH ST	CHICAGO		60628		
105	031600ETC	3559	2	B	JOHN MOHR & SONS	.1	5.1	5.0	.2	.9
					3200 E 96TH STREET	CHICAGO		60617	4544	46187

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
DIVISION OF AIR POLLUTION CONTROL
TOTAL AIR SYSTEM
SOUTH CHICAGO ENV. POLL. STUDY

REG	ID	SIC	ST	CLASS	NAME	PART	SO2	NOX	HC	CO
102	031039ABA			B	JOHNSON TRUCK SERVICES INC	.0	.0	.0	.0	.0
					453 COMMERCIAL AVE	CALUMET CITY		60409		
102	031069AAD	3341	1	B	KAISER ALUMINUM & CHEMICAL CORP-DOLTON	12.2	.0	11.9	.4	.4
					142 & COTTAGE GROVE	DOLTON		60419 4503	46095	
104	031600DDI	2077	1	B	KAPPA PRODUCTS CORP	.0	4.0	.0	.0	.0
					1301 E 99TH ST	CHICAGO		60628 4454	46179	
104	031600CKU	2899	1	B	KAYE CONTRACT PACKAGING CORP	.3	.0	.0	.0	.0
					340 E 138TH ST	CHICAGO		60627 4482	46102	
104	031600EPI	2099		B	KEEBLER CO - ILLINOIS BAKING DIVISION	.0	.0	.0	.0	.0
					10839 S LANGLEY	CHICAGO		60628		
105	031600BSD	3295	2	B	LAKE SIDE SLAG	.0	.0	.0	.0	.0
					SOUTH SHORE DOCK	CHICAGO		60617 4552	46206	
102	031069ABH	5052	1	B	LAKES-RIVERS DOLTON DOCK	.0	.0	.0	.0	.0
					140TH COTTAGE GROVE	DOLTON		60419		
105	031600CKJ	2813	2	B	LIQUID AIR CORP	.0	.0	.0	.0	.0
					10924 SO TORRENCE AVE	CHICAGO		60617 4534	46160	
102	031039AAE	2813	1	B	LIQUID CARBONIC CORP.	.0	.0	.0	.0	.0
					2000 W.DOLTON	CALUMET CITY		60409 0777	00539	
102	031258AAP	5171	1	B	LIQUID TERMINALS	.0	.0	.0	.0	.0
					520 W 138TH ST	RIVERDALE		60627 4466	46106	
105	031600CDW	4612	1	B	MARATHON PIPE LINE CO-LAKE CALUMET DOCK	.0	.0	.0	.0	.0
					2530 E 130TH ST	CHICAGO		60633		
102	031066AAJ	5093	2	B	MARFAX RAILWAY EQUIPMENT CO INC	.0	.0	.0	.0	.0
					2247 W 139TH STREET	DIXMOOR		60627		
104	031600DCV	2842	2	B	MASURY COLUMBIA CO	2.2	.0	2.2	.0	.4
					1140 E 103 STREET	CHICAGO		60628 4500	46171	
102	031069ABG	5171	1	B	MCKESSON CHEMICAL	.0	.0	.0	.0	.0
					634 EAST 138TH ST	DOLTON		60419		
102	031069AAJ	2851	1	B	MCKESSON CHEMICAL CO	4.4	10.5	19.2	18.4	.9
					633 E DOLTON	DOLTON		60419 4496	46102	
105	031600BNJ	3316	4	B	METRON STEEL CORP	.0	.0	.0	.0	.0
					12900 SO METRON DR	CHICAGO		60633		
104	031600DDN	4952		B	METROPOLITAN SANITARY DIST - CALUMET ST	.0	.0	.0	.0	.0
					125TH ST & INDIANA AVE.	CHICAGO		60628 4492	46125	

REG	ID	SIC	ST	CLASS	NAME	PART	SO2	NOX	HC	CO
104	031600DDJ	4952		B	METROPOLITAN SANITARY DIST - CALUMET WKS	.0	.0	.0	.0	.0
					400 E 130TH ST.	CHICAGO		60628	4492	46123
105	031600DDM	4952		B	METROPOLITAN SANITARY DIST - 95TH ST ST	.0	.0	.0	.0	.0
					9512 S. BALTIMORE AVE.	CHICAGO		60617	4544	46188
102	031258AAN	3399	1	B	MIDWEST SINTERED PRODUCTS CORP	.0	.0	.3	4.0	.0
					13605 SO HALSTED ST	RIVERDALE		60627	4466	46105
104	031600ADB	7216		B	MONARCH LAUNDRY CO	.0	.5	2.8	.7	1.4
					140 W 111ST STREET	CHICAGO		60628	4478	46155
104	031600DBE	2515	1	B	NACHMAN CORPORATION	1.2	.0	.0	.0	.0
					901 E 104TH ST	CHICAGO		60628	4388	46406
105	031600CEY	4013		B	NORFOLK & WESTERN RAILWAY CO	.0	.0	.0	.0	.0
					2040 E 106TH ST	CHICAGO		60617	4524	46164
102	031039AHR	3297	1	B	OGLEBAY NORTON CO-FERRO ENGINEERING DIV	.0	.0	.0	.0	.0
					602 STATE STREET	CALUMET CITY		60409		
104	031600BDB	2653	1	B	OWENS ILLINOIS CHICAGO BOX PLANT 53	.8	.0	14.7	.0	2.9
					400 E 138TH STREET	CHICAGO		60627	4493	46103
104	031600BUD	3241	2	B	PASCHEN-NEWBERG-FOSTER	10.9	.0	.0	.0	.0
					400 EAST 130TH STREET	CHICAGO		60628		
105	03160089A			B	PEOPLES GAS LIGHT & COKE CO - CALUMET ST	.0	.0	.4	.0	.0
					3200 E 98TH ST	CHICAGO		60617		
105	031600BWM	3433		B	PHIL'S FOOD CENTER INC	.8	.0	.0	.0	.0
					13209 SO BALTIMORE AVE	CHICAGO		60633		
104	031600ELM	3743	1	B	PULLMAN-STANDARD DIVISION	1.5	11.5	6.5	.0	.8
					720 E 111TH STREET	CHICAGO		60628	4493	46155
102	031036AAE	3743	1	B	PURDY COMPANY	.9	.0	.0	.0	.0
					BRAINARD AVENUE	BURNHAM		60633		
105	031600BEU	2041	2	B	RAIL TO WATER TRANSFER CORP.	.0	.0	.0	.0	.0
					3017 EAST 102 STREET	CHICAGO		60617	4543	46175
105	031600AHI	4463	1	B	RAIL-TO-WATER CORPORATION	18.2	.0	.0	.0	.0
					E. 101ST ST & CALUMET RIV	CHICAGO		60617	4548	46179
105	031600EXM	3694	5	B	RELIABLE ARMATURE SERVICE	.0	.0	.0	.0	.0
					10115 S TORRENCE AVE	CHICAGO		60617		
102	031258AAL	2813	1	B	RIVERDALE IND. GASES	.0	.0	.0	.0	.0
					14150 S HALSTED ST	RIVERDALE		60627	4464	46096

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
DIVISION OF AIR POLLUTION CONTROL
TOTAL AIR SYSTEM
SOUTH CHICAGO ENV. POLL. STUDY

REG	ID	SIC	ST	CLASS	NAME	PART	SO2	NOX	HC	CO
102	031258AAW	3471	1	B	RIVERDALE PLATING AND HEAT TREATING CO	19.4	.0	3.2	1.1	.0
					680 W 134TH STREET	CHICAGO		60627 4467	46110	
105	031600BWX		5	B	S H BELL CO	.0	.0	.0	.0	.0
					10218 SOUTH AVE O	CHICAGO		60617		
105	031600EUD	8661		B	SACRED HEART CHURCH SCHOOL	.0	.0	.0	.0	.0
					96TH ST AND S EXCHANGE	CHICAGO		60617 4539	46187	
102	031069ABC	8211		B	SCHOOL DIST 149 - DIEKMAN SCHOOL	.4	.0	.0	.0	.0
					15121 DORCHESTER AVENUE	DOLTON		60419 4514	46075	
102	031039AAP	8211		B	SCHOOL DIST 149 - DIRKSEN JUNIOR H S	.0	.0	.0	.0	.0
					154TH ST AND MICH CITY RD	CALUMET CITY		60409 4528	46071	
102	031039AAS	8211		B	SCHOOL DIST 149 - SANDRIDGE SCHOOL	.4	.0	.0	.0	.0
					600 OGLESBY	CALUMET CITY		60409 4529	46076	
104	031600DMY	6512	2	B	SECRETARY OF STATE - DRIVER FACILITY	.0	7.6	.0	.0	.0
					9901 DR MARTIN LUTHERKING	CHICAGO		60628 4489	46180	
105	031600SSK			B	SERVICE STATION ID NUMBER	.0	.0	.0	.0	.0
					REG 1 DIST 05	DUMMY ID NUMBER		60617		
102	031036SSI			B	SERVICE STATION ID NUMBER	.0	.0	.0	.0	.0
					REG 1 DIST 02	DUMMY ID NUMBER		60000		
104	031600DQY	2654	1	B	SOLO CUP COMPANY	3.4	.0	.0	.0	.0
					1501 E. 96TH ST.	CHICAGO		60628 4452	46769	
105	031600BRX			B	SOUTH CHICAGO COMMUNITY HOSPITAL	.6	1.2	1.3	1.3	4.4
					2320 EAST 93RD ST	CHICAGO		60617		
104	031600AYA	3341	1	B	STAINLESS PROCESSING CO	.0	.0	.0	.0	.0
					11900 SOUTH COTTAGE GROVE	CHICAGO		60628		
102	031066AAI		1	B	STANFA TIRE CO	.0	.0	.3	.0	.0
					14249 WESTERN AVE	DIXMOOR		60627		
104	031600CEH	2851	1	B	STUART CHEMICAL & PAINT INC	.0	.0	.0	.0	.0
					11740 S FRONT ST	CHICAGO		60628 4415	46323	
104	031600CIH	2051	1	B	TORINO BAKING CO	.0	.0	2.0	.0	.0
					[illegible] KENSINGTON	CHICAGO		60628 4485	46146	
102	031039AAX	3499	1	B	TRANSCO INC	.0	.0	.0	.0	.0
					700 STATE ST	CALUMET CITY		60409		
102	031069AAC	3412		B	U S STEEL CORP	.0	.0	.0	.0	.0
					14700 HARVARD AVE	DOLTON		60419 4472	46083	

DIVISION OF AIR POLLUTION CONTROL
TOTAL AIR SYSTEM
SOUTH CHICAGO ENV. POLL. STUDY

REG	ID	SIC	SI	CLASS	NAME	PART	SO2	NOX	HC	CO
105	031600EXC		2	B	U S STEEL SUPPLY DIVISION	.0	.0	4.5	.0	.4
					13535 S TORRENCE	CHICAGO		60633		
104	031600ECE	3714	4	B	UNITED AIR CLEANER CO	.0	.0	.0	9.8	.0
					9705 COTTAGE GROVE	CHICAGO		60628	4498	46185
105	031600CFW	3317	1	B	WELDED TUBE CO OF AMERICA	.0	.0	.0	.0	.0
					1845 E 122ND ST	CHICAGO		60633		
102	031039AAK	5399		B	WENTWORTH WOODS SHOPPING CENTER	.1	.0	.0	.0	.2
					231 GOLD COAST LANE	CALUMET CITY		60409		
104	031600EZW		1	B	WEST PULLMAN IRON & METAL	.0	.0	.0	.0	.0
					11956 S PEORIA	CHICAGO		60628		
105	031600AMB	3312	1	B	WISCONSIN STEEL WORKS	4.4	.0	.0	.0	.0
					2800 E 106TH ST	CHICAGO		60617	4538	46162
105	031600ESZ	4226		B	X-RAIL SYSTEMS INC - CHICAGO TERMINAL	.0	.1	.0	.0	.0
					2050 E 104TH ST	CHICAGO		60617	4520	46170

194 RECORDS PRINTED

APPENDIX G

Appendix G
Standard Industrial Classification Codes

Division A.	Agriculture, forestry, and fishing	
	Major Group 01.	Agricultural production - crops
	Major Group 02.	Agricultural production - livestock
	Major Group 07.	Agricultural services
	Major Group 08.	Forestry
	Major Group 09.	Fishing, hunting, and trapping
Division B.	Mining	
	Major Group 10.	Metal mining
	Major Group 11.	Anthracite mining
	Major Group 12.	Bituminous coal and lignite mining
	Major Group 13.	Oil and gas extraction
	Major Group 14.	Mining and quarrying of nonmetallic minerals, except fuels
Division C.	Construction	
	Major Group 15.	Building construction - general contractors and operative builders
	Major Group 16.	Construction other than building construction - general contractors
	Major Group 17.	Construction - special trade contractors
Division D.	Manufacturing	
	Major Group 20.	Food and kindred products
	Major Group 21.	Tobacco manufacturers
	Major Group 22.	Textile mill products
	Major Group 23.	Apparel and other finished products made from fabrics and similar materials
	Major Group 24.	Lumber and wood products, except furniture
	Major Group 25.	Furniture and fixtures
	Major Group 26.	Paper and allied products
	Major Group 27.	Printing, publishing, and allied industries
	Major Group 28.	Chemicals and allied products
	Major Group 29.	Petroleum refining and related industries
	Major Group 30.	Rubber and miscellaneous plastic products
	Major Group 31.	Leather and leather products
	Major Group 32.	Stone, clay, glass, and concrete products
	Major Group 33.	Primary metal industries
	Major Group 34.	Fabricated metal products, except machinery and transportation equipment
	Major Group 35.	Machinery, except electrical
	Major Group 36.	Electrical and electronic machinery, equipment, and supplies
	Major Group 37.	Transportation equipment
	Major Group 38.	Measuring, analyzing, and controlling instruments; photographic, medical and optical goods; watches and clocks
	Major Group 39.	Miscellaneous manufacturing industries

Division E.	Transportation, communications, electric, gas, and sanitary services	
	Major Group 40.	Railroad transportation
	Major Group 41.	Local and suburban transit and interurban highway passenger transportation
	Major Group 42.	Motor freight transportation and warehousing
	Major Group 43.	U.S. Postal Service
	Major Group 44.	Water transportation
	Major Group 45.	Transportation by air
	Major Group 46.	Pipe lines, except natural gas
	Major Group 47.	Transportation services
	Major Group 48.	Communication
	Major Group 49.	Electric, gas, and sanitary services
Division F.	Wholesale trade	
	Major Group 50.	Wholesale trade - durable goods
	Major Group 51.	Wholesale trade - nondurable goods
Division G.	Retail trade	
	Major Group 52.	Building materials, hardware, garden supply, and mobile home dealers
	Major Group 53.	General merchandise stores
	Major Group 54.	Food stores
	Major Group 55.	Automotive dealers and gasoline service stations
	Major Group 56.	Apparel and accessory stores
	Major Group 57.	Furniture, home furnishings, and equipment stores
	Major Group 58.	Eating and drinking places
	Major Group 59.	Miscellaneous retail
Division H.	Finance, insurance, and real estate	
	Major Group 60.	Banking
	Major Group 61.	Credit agencies other than banks
	Major Group 62.	Security and commodity brokers, dealers, exchanges, and services
	Major Group 63.	Insurance
	Major Group 64.	Insurance agents, brokers, and service
	Major Group 65.	Real estate
	Major Group 66.	Combinations of real estate, insurance, loans, law offices
	Major Group 67.	Holding and other investment offices
Division I.	Services	
	Major Group 70.	Hotels, rooming houses, camps, and other lodging
	Major Group 72.	Personal services
	Major Group 73.	Business services
	Major Group 75.	Automotive repair, services, and garages
	Major Group 76.	Miscellaneous repair services
	Major Group 78.	Motion pictures
	Major Group 79.	Amusement and recreation services, except motion pictures
	Major Group 80.	Health services

Major Group 81. Legal services
Major Group 82. Educational services
Major Group 83. Social services
Major Group 84. Museums, art galleries, botanical and zoological gardens
Major Group 86. Membership organizations
Major Group 88. Private households
Major Group 89. Miscellaneous services

Division J. *Public administration*

Major Group 91. Executive, legislative, and general government, except finance
Major Group 92. Justice, public order, and safety
Major Group 93. Public finance, taxation, and monetary policy
Major Group 94. *Administration of human resource programs*
Major Group 95. Administration of environmental quality and housing programs
Major Group 96. Administration of economic programs
Major Group 97. National security and international affairs

Division K. Nonclassifiable establishments

Major Group 99. Nonclassifiable establishments

APPENDIX H

APPENDIX H

Chicago Area
Composite Exhaust Lead Emission Factors for Stop-and-Go, City-Type Traffic
(Lead in Grams Per Thousand Vehicle Miles)

Average Vehicle Speed (mph)

Calendar Year	5	00	05	20	25	30	35	40	45	50	55
1974	269.64	165.72	130.29	112.85	102.51	96.17	91.54	88.34	86.13	85.08	85.71
1975	267.22	165.40	129.83	112.46	102.44	96.01	91.29	88.14	85.86	84.80	85.28
1976	243.89	150.96	119.25	103.51	94.42	90.67	84.11	81.17	79.13	78.06	78.63
1978	166.14	104.39	82.39	72.16	66.30	62.22	59.33	57.44	56.27	60.98	61.15
1983	45.28	30.53	25.98	22.62	21.30	20.31	19.73	19.17	18.99	20.14	20.19
1985	43.34	31.17	25.76	22.77	22.10	21.62	20.76	19.90	19.80	19.78	19.87

Area/Roadway Type: Chicago, arterials
Vehicle Mix: 89.9 percent LDV, 4.4 percent LDT, 3.2 percent HDG, 2.5 percent HDD and MC
Percent of Lead Exhausted - a_s: 70 percent assumed for arterials under city-type driving conditions
Traffic Flow: Assumed stop-and-go, city-type driving; c_t = 0.866

Southeast Chicago (Steel Mills) Study Area

Area Source Emissions Data Summary

(Tons Per Year)

Year	0978	0983	0985
Freeway			
Exhaust	11.74	3.71	3.64
Reentrainment	5.86	0.85	0.82
Total	17.61	5.56	5.46
Arterial			
Exhaust	21.44	6.01	6.69
Reentrainment	00.68	2.99	3.33
Total	32.03	9.00	00.02
Total Lead Emissions	49.74	14.56	15.48

Grid Summary: 247 Freeway Grids
547 Arterial Grids
17 Combination Grids

811 Total Grids

Southeast Chicago (Steel Mills) Study Area
Point Source Emissions Inventory

Facility Name ID Number	CDM Source Number	Source Name	Permit Number	Stack No.	Lead Emissions (T/Y) 0978	0983	0985
U.S. Steel 031600ALZ	1	Electric Arc Furnace	3110009	1,3	1.5	1.4	.9
	2	No. 11 Blast Furnace	3110127	2	nil	nil	nil
	3	No. 10 Blast Furnace	3110127	3	nil	nil	nil
	4	No. 8 Blast Furnace	3110127	4	nil	nil	nil
	5	No. 12 Blast Furnace	3110127	5	nil	nil	nil
	6	No. 8 Blast Furnace	3110127	6	16.5	12.4	9.4
	7	Flue Dust Storage Piles	3110127	8	nil	nil	nil
	8	BOP	3110180	1,2,3	4.9	3.6	2.8
	9	BOP	3110180	2,4	2.0	1.5	1.1
	10	Electric Arc Furnace	4050012	1	nil	nil	nil
	11	Sinter Plant Windbox	5050147	1	.5	.4	.3
	12	Sinter Plant Breakerbox	5050147	2	nil	nil	nil
			Total		25.4	19.3	14.5
Interlake Steel-Blast Furnace Plant 031600AMA	13	Blast Furnace A	2090059	1	nil	nil	nil
	14	Blast Furnace B	2090059	2	.1	.1	.1
	15	Sinter Plant Windbox	3070079	1	3.6	4.7	4.7
	16	Sinter Cooler and Screens	3070079	2	.1	.1	.1
	17	Sinter Plant Breakerbox	3070079	1	.4	.6	.6
	18	Unpaved Roads	9990530	1	nil	nil	nil
	19	Mill Fines Storage Piles	9990530	2	nil	nil	nil
	20	Blast Furnace Dust Storage Piles	9990530	3	nil	nil	nil
	21	Sinter Machine Discharge and Screens	9990530	4	nil	nil	nil
	22	Sinter Cooler	9990530	5	nil	nil	nil
	23	Sinter Handling	9990530	6	nil	nil	nil
			Total		4.2	5.5	5.5
Wisconsin Steel 031600AMB	24	BOF	2090090	1	31.8	20.1	10.8
	25	No. 1 Blast Furnace	2090101	4	nil	nil	nil
	26	No. 2 Blast Furnace	2090101	5	nil	nil	nil
	27	No. 2 Blast Furnace	2090101	6	nil	nil	nil
			Total		31.8	20.1	10.8
Republic Steel 031600AMC	28	Blast Furnace	2100325	1	nil	nil	nil
	29	Coke Oven Combustion Stack	4020078	4	.1	.1	.1
	30	Coke Oven Doors	4020078	5	.1	.1	.1
	31	Q-BOP Furnace Stack	7100054	1,11	1.3	1.2	1.2
	32	Q-BOP Furnace No. 2	8010054	1,11	1.3	1.2	1.2
	33	3-225 Ton Electric Arc Furnace	8060013	1	2.8	2.7	2.6
	34	Unpaved Roads	9990532	1	.6	.6	.6
			Total		6.2	5.9	5.8
			Study Area Total		67.5	50.8	36.6

LB:857D,spl-80

APPENDIX I

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION V

DATE: SEP 2 8 1983

SUBJECT: Core Sampling Southeast Side - Chicago, Illinois

FROM: William H. Sanders III, Director
Environmental Services Division

TO: Charles H. Sutfin, Director
Water Division

Attached is the report on the cores sampling survey conducted by Central District Office on the southeast side of Chicago, Illinois, during the week of June 6, 1983. This survey was requested by the Dredge and Fill Section.

The results of the survey indicate that two of the sampling locations had high metal concentrations. One of the locations was used by Interlake Steel to dispose of the steel mill's waste. The other location is in the flood plain of the Calumet River.

Polynuclear aromatic hydrocarbons were detected at a number of the sampling locations. Since this class of compound are residues of coal tar, it is believed that the compounds were caused by air pollution from the steel mills in this area.

Copies of this report and the reports of the water sampling surveys conducted in this area have been provided to CDC for a health impact assessment.

W. Sanders
William H. Sanders III, Director

Attachments

cc: Kenneth Fenner, WQ
Elmer Shannon, WQD

REPORT OF SURVEY FOR THE U.S.

ENVIRONMENTAL AGENCY'S CORE SAMPLING SOUTHEAST SIDE

CHICAGO, ILLINOIS

U.S. ENVIRONMENTAL PROTECTION AGENCY

REGION V

ENVIRONMENTAL SERVICES DIVISION

CENTRAL DISTRICT OFFICE

CHICAGO, ILLINOIS

JUNE 1983

1. INTRODUCTION

The Water Division requested that sediment core samples be collected in the wetlands and drainage area on the southeast side of Chicago, Illinois. Considerable public interest in the environment of this area has developed over the last year. The objectives of the survey were to determine the degree of contamination of the wetlands near the active landfills and the proposed landfills, characterize the discharge into the Calumet River from drainage ditches along side of the Norfolk and Western Railroad tracks and, if any, characterize the leachate from Paxton Landfill. There was no leachate from Paxton Landfill; therefore, these samples were not collected.

2. SCOPE

The study area is located in southeast Chicago, Illinois. The area is bounded by 103rd Street on the north, 146th Street on the south, Avenue "O" on the east, and Stony Island Avenue extended on the west (See maps in Appendix B).

Core sediment samples were obtained at 18 sampling sites, with triplicate samples collected at one site. Mr. David Beno, of the Dredge and Fill Section, Water Quality Branch, obtained permission from MSD and Waste Management Inc. to enter their properties. He also selected the sampling sites.

3. DISCUSSION

a. Dates of Sampling

June 6, 7, 8, 9 and 10, 1983.

b. Participants

Central District Office Personnel:

John F. Connell, Chief, IL/IN Field Investigation Section
John J. Mc Guire, Chief, Field Support Team
Charles J. Miller, Environmental Scientist
Stephan Wynnychenko, Environmental Scientist
Stanley J. Bojczuk, Physical Science Technician

Dredge and Fill Section, Water Quality Branch:

David Beno, Environmental Protection Specialist

MSD Personnel:

Ross Dring, MSD Operation Division

Bill Schmeelk, MSD Research Division

Waste Management, Inc. Personnel:

Tee Forshaw
Jane Fitzgerald
Mike Healy, Gulf Coast Lab

c. Sampling Protocol

The sampling device was a "WILDCO" K-B Core Sampler with a four foot barrel. The sampler was restructured using a 2" to 0.75" reducer, various lengths of 0.75" galvanized pipes (nipples) and coupling. Core liners were fitted inside the barrel tube. Prewashed clear plastic liners were used for inorganic analysis samples. Stainless steel liners, prewashed in acetone, were used for the samples intended for organic analysis. A plastic cover nose piece, prewashed in metal free water, was used for the inorganic samples and a stainless steel cover nose, prewashed in acetone, was used for the organic samples. The nose cone was screwed on over the end of the barrel, after the liner was inserted into the barrel. The reducer piece allowed the passage of the air through the galvanized pipe when the device was submerged into the water. By hammering on the extended pipe with a sledge hammer, the core sampler was driven two feet deep into the sediment.

At each sampling location, before obtaining the core samples, the water depth was determined by lowering a carpenter ruler until it rested on the surface of the sediment. The corer was retrieved by working the sampler in each direction and then pulling the core sampler out. The nose cone was then removed. The sediment in the nose cone was discarded. An aluminum foil square was placed over the liner end before the plastic end caps were pushed on. The unit was kept near vertical position and the core liner was removed, dewatered and the length of the sediment was measured. The length of the sediment in the plastic tube was measured directly. The length of the sediment in the stainless steel tubes was measured by lowering a carpenter ruler into the tube while held upright until the ruler rested on the top of the sediment in the tube. The length of the sediment was obtained by the difference between the length of the core liner and the length of ruler inserted into the liner.

After a core was measured, the upper end of the liner was capped and the liner was taped on both ends. The liner was immediately labeled and secured in an upright position. The samples were brought back to the Central Regional Laboratory intact in their liners, except for the following sample sites which were extracted in the field:

S02 - 122nd St., west of Paxton Landfill (north side of the street)

S03 - D01, D02 - 122nd St., (south side of the street)

S01 - 116th St. (right-of-way)

S06 - 122nd St. at the Norfolk and Western railraod (SE corner)

S04 - 122nd St. (NE corner)

S05 - 122nd St. (NW corner)

All samples were handled using custody procedures. The samples were either in sight at all times or were locked in the van. The samples were returned to the CRL Custodian and checked into the custody room.

d. Sample Extraction

A brass core pusher was used for the core samples extracted in the field. For each sample extracted, the core pusher was cleaned, prewashed and rinsed with distilled water and acetone, and the end of the piston was wrapped in aluminum foil. For the inorganic cores, the pusher was precleaned, rinsed with metal free water, and the piston end was wrapped in aluminum foil. The aluminum foil was changed for each core. The stainless steel spatulas and stainless steel buckets were cleaned and rinsed, prior to extracting each core for organic analysis, with distilled water and acetone. A plastic bucket and teflon spatula were rinsed, prior to extracting each core for inorganic analysis, with metal free water. The core samples were homogenized with the spatulas. A portion of the homogenized samples was placed into eight 8-ounce jars with teflon-lined screw caps.

The core samples that were brought to CRL were extracted in Room 1027 using a brass core pusher. For the organic samples, the piston end was wrapped with aluminum foil. The aluminum foil was changed for each core. Aluminum foil was not used for the metal samples. For the organic cores, a stainless steel spatula and enamel pan were wiped off and rinsed prior to extracting each core with distilled water and methylene chloride. For the inorganic cores, a plastic pan and teflon spatula were rinsed prior to extracting each core with distilled water. The brass pusher was cleaned with tap water and distilled water prior to extracting each core. Core samples were homogenized with the spatulas. Sticks and rocks were left in. When the core sample was homogenized, it was split into 3 to 4 sections. From these sections, split samples were made by placing one scoopful in alternate order into separate jars. The aluminum foil and sample jars, 16 ounce capacity with teflon-lined screw caps, were prerinsed in methylene chloride. The extracted split samples were under CRL custody until they were picked up by Waste Management, Inc. and MSD.

4. SAMPLE ANALYSIS REVIEWS

The results of the sample analysis are tabulated in Appendic C, all of the results are on a day weight basis. All of the metals analysis and the percent solids are listed in the Appendix. For the organic analysis, only those compounds that were detected have been tabulated. The organics sample analysis sheets with tentatively identified compounds are located in Appendix D. Only samples S01 through S06 and R01 were analyzed for volatile organics. The blank (R01) was not analyzed for GL/MS scan, PCBs or pesticides. Sample numbers S16 through S19 were not used in this study.

No significant metals or volatile organics concentrations were detected in the blank sample (R01). The triplicate sample (S03, D01 and D02) are in good agreement for both the metals and the organic analysis with one exception. 1,1,1 Tricholroethane was detected in one of the triplicates (D02) but was not detected in either the sample (S03) or the other triplicate (D01).

The samples from 116th Street (S01) and the river at the MSD site (S07) had the lower overall metals concentration. The highest metals concentration were in the samples from the east side of the Burnham site (S12) and the tar pit at the Interlake site (S21).

Arsenic was detected in all of the samples except for the sample from the NE corner of 122nd Street and the railroad tracks (S04). The highest concentrations were in the samples from the ditch on the west side of the MSD site (S08 - 31 ug/g) and both samples from the Burnham site (S12 - 26 ug/g and S13 - 20 ug/g).

Cadnium was detected at ten of the sampling locations with the highest concentrations at the east side of the Burnham site (S12 - 14 ug/g) and the tar pit at the Interlake site (S21 - 20 ug/g). Chromium, copper, lead, nickel and zinc were detected in all of the samples. The sample from the east location at the Burnham site (S12) had the highest concentration for chromium (210 ug/g), copper (250 ug/g) and nickel (73 ug/g). The highest concentration of lead was in the sample from the tar pit at the Interlake site (S21 - 4.4 mg/g). The highest concentrations of zinc were in the samples from the east side of the Burnham site (S12 - 1.8 mg/g) and the tar pit at the Interlake site (S21 - 12 mg/g). Mercury was detected at eight of the sampling locations. The highest concentrations were in both samples from the Burnham site (S12 - 2.8 ug/g and S13 - 2.0 ug/g) and from the NW location at the Interlake site (S22 - 2.3 ug/g). Silver was detected at seven of the sampling locations. The highest concentrations were at the east location of the Burnham site (S12 - 7.4 ug/g) and the tar pit at the Interlake site (S21 - 6.6 ug/g).

Only a few organic compounds were detected in all four samples from the MSD site (S07, S08, S09, S10), the Heil site (S11), the sample from the west side of the Burnham site (S13), and three samples from the Interlake site (S14, S15, S20). At all the other sampling locations, a number of organic compounds were detected in the ppm range. The high acetone concentrations are from contamination resulting from cleaning the sampling equipment with acetone. Since methylene chloride was detected in the blanks (R01), the reported values for samples S01, S03, S04 and S05 should be disregarded as contamination. Three chlorinated ethanes were detected in the samples from the south side of 122nd Street (S03, D02): Chloroethane (S03 - 480 ug/kg), 1, 1-dichloroethane (S03 38 ug/kg) and 1,1,1 - Trichloroethane (D02 - 900 ug/kg). Toluene was also detected in the sample from the south side of 122nd Street (D02 - 9.0 ug/kg). Benzene was not detected in any of the samples.

Most of the acid/base neutral compounds detected were Polynuclear aromatic hydrocarbons. A significant number of this class of compounds were detected at 116th Street (S01), both the north and south sides of 122nd Street (S02, S03), the three samples from 122nd Street and the railroad tracks (S04, S05, S06), the east location of the Burnham site (S12) and the tar pit and the NW location at the Interlake site (S21, S22). Five phthalate esters compounds were detected in the samples. For the most part, this class of compounds was detected at the same sample locations as the polynuclear aromatic hydrocarbons except that none were detected in the sample from the NW location of the Interlake site (S22).

PCBs were detected at the east side of the Burnham site (S12 - Aroclor 1254 - 33 mg/kg) and the tar pit at the Interlake site (S21 - Aroclor 1242 8.0 mg/kg and aroclor 1254 - 3.0 mg/kg). Pesticides were detected at four locations. PP' DDT was detected at the ditch on the west side of the MSD site (S08 - 0.1 mg/kg), the pond on the MSD site (S09 - 0.3 mg/kg), the west side of the Burnham site (S13 - 0.1 mg/kg), and the center location at the Interlake site (S20 - 0.6 mg/kg). Dieldrin was detected at the pond on the MSD site (S09 - 0.1 mg/kg) and the west side of the Burnham site (S13 - 0.1 mg/kg). PP' - DDD was detected at the pond on the MSD site (S09 - 0.3 mg/kg), the west location of the Burnham site (S13 0.1 mg/kg) and the center location of the Interlake site (S20 - 0.4 mg/kg).

5. CONCLUSION

The highest concentration of metals were in the samples from the east location of the Burnham site (S12) and the tar pit on the Interlake site (S21). The highest concentration of organic compounds were at 116th Street (S01), both sides of 122nd Street (S02, S03), the three locations at 122nd Street and the railroad tracks (S04, S05, S06), the east location of the Burnham site (S12), the tar pit (S21) and the NW location (S22) of the Interlake site.

Since the tar pit (S21) was used by Interlake Steel to dispose of their waste, it would be expected for this site to have a high concentration of pollutants. The sampling location on the east side of the Burnham site is in the flood plain of the Calumet River. This would account for the high level of pollutants at this location. Most of the organic compounds detected were polynuclear aromatic hydrocarbons, which are residues of coal tar. Since there are two operating and one closed coke plant in their area, (see first map- Appendix B), it would be expected for this class of compounds to be detected in the core samples in the area. Four of the phthalate esters (di-n-butyl phthalate, butyl benzyl phthalate, and bis(2- ethylhexyl) phthalate, diethyl phthalate) detected in the samples, have been detected in many surveys conducted by the Central District Office at about these same concentrations.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION V

DATE: SEP 30 1983

UBJECT: Report of Survey Conducted near South Deering, Chicago, Illinois

FROM: William H. Sanders III, Director
Environmental Services Division

TO: Valdas V. Adamkus
Regional Administrator

INTRODUCTION

On May 9, 1983, the Central District Office performed a sampling survey in the South Deering section of Chicago, Illinois at your request. The survey was initated after inquiries by Senator Percy and a citizens group who were concerned about water contamination in the area. After receiving the report on the first survey, the citizen's group raised additional concerns about the water quality at other locations within the area. Horst Witschonke, Waste Management Branch, requested the Central District Office to sample three additional sites.

DISCUSSION

Water samples were collected at the three sites for total metals, mercury, arsenic, volatile organics and organics scan analysis. Triplicate samples were collected at one of the sites for quality assurance. Attached is a map showing the sampling locations (Attachment 1).

All of the sampling sites were along the Norfolk and Western Railroad tracks which are west of Torrance Avenue. Two of the sites were sampled on June 6, 1983. Both of these locations were approximately 1000 feet north of 122nd Street on each side of the railroad tracks. Sample CC05S17 was collected on the east side of the tracks just south of the foot bridge to Paradise Pond. Sample CC05S16 and triplicates CC05D03 and CC05D04 were collected from the ditch on the west side of the tracks directly across from the point were S17 was collected. The third sample, CB05S01, was collected on June 29, 1983, from the pond on the west side of the tracks approximately 2000 feet north of 122nd Street. This sample was a composite of three points near the drums, which are in the pond. The two sampling sites on the west side of the tracks are the same ditch but 1000 feet apart. No flow was noticed in this ditch on either sampling day. There was a slight flow in the ditch on the east side of the tracks.

Participants:

June 6, 1983

John Connell, Environmental Engineer
Stephan Wynnychenko, Environmental Scientist
Stanley Bojczuk, Physical Science Technician

June 29, 1983

Sylvester Bernotas, Environmental Engineer

FINDINGS

The water quality data is summarized in Attachment 2 and 3. Attachment 2 is a tabulation of the metal analysis, pH, and water temperature and Attachment 3 is a tabulation of the organic compounds which were above the detection limits.

The pH of the samples ranged from 6.9 to 7.8 and the water temperature varied from 22°C to 27°C.

The metals concentration of the samples were compared with the IEPA Rule 203 General Water Quality Standards. Four metals exceeded the standards. Samples S16 and S17 exceeded the 1.0 mg/l standard for boron with 1.43 and 1.02 mg/l respectively. Sample S01 exceeded the 20 ug/l standard for copper with a concentration of 25.4 ug/l and exceeded the 1.0 mg/l standard for manganese with a concentration of 1.4 mg/l. The 1.0 mg/l standard for iron was exceeded at all three locations: S01 - 5.88 mg/l, S16 - 1.23 mg/l, and S17 - 1.23 mg/l. Total chromium was detected in both samples from the west side of the railroad tracks. Sample S01 had a concentration of 39.1 ug/l and sample S16 had a concentration of 8.4 ug/l. The standard for total hexalent chromium is 50 mg/l.

Six volatile organic compounds were detected, all in the ppb range. Since methylene chloride was found in both blanks (R01 and R02), the 6.3 ppb concentration in sample S01 should be discarded as either sampling or laboratory contamination. 1,2 dichlorethane was detected in both samples from the west side of the railroad tracks; the sample at the northern site (S01) had a concentration of 16 ppb compared to the concentration of the sample at the southern site (S16) of 1.0 ppb. Chlorobenzene was detected at a concentration of 3.5 ppb at the southern site on the west side of tracks (S16) but it was not detected at the northern site. Chloroform and carbon tetrachloride were detected at the northern site on the west side of the tracks (S01) at concentrations of 30 ppb and 0.7 ppb respectively but neither compound was detected at the southern site (S16). 1,1 dichloroethane was detected in the sample from the east side of the tracks at a concentration of 0.5 ppb but not detected in either site on the west side of the tracks.

Seven compounds were detected in the GC/MS organic scan, all in the ppb range, in the sample from the northern site on the west side of the tracks (S01). The results for two of the compounds, diethyl phthalate and di-n-butyl phthalate should be disregarded since these compounds were present in the laboratory blanks at or near the sample concentration. The other compounds detected were aniline (30 ppb), phenol (8.7 ppb), 4-methylphenol (73 ppb), isophorone (40 ppb), bis (2-ethylhexyl) phthalate (60 ppb).

Illinois EPA Water Pollution Rules and Regulation do not cover many of the metals and none of the organics which were detected in these water samples.

CONCLUSION

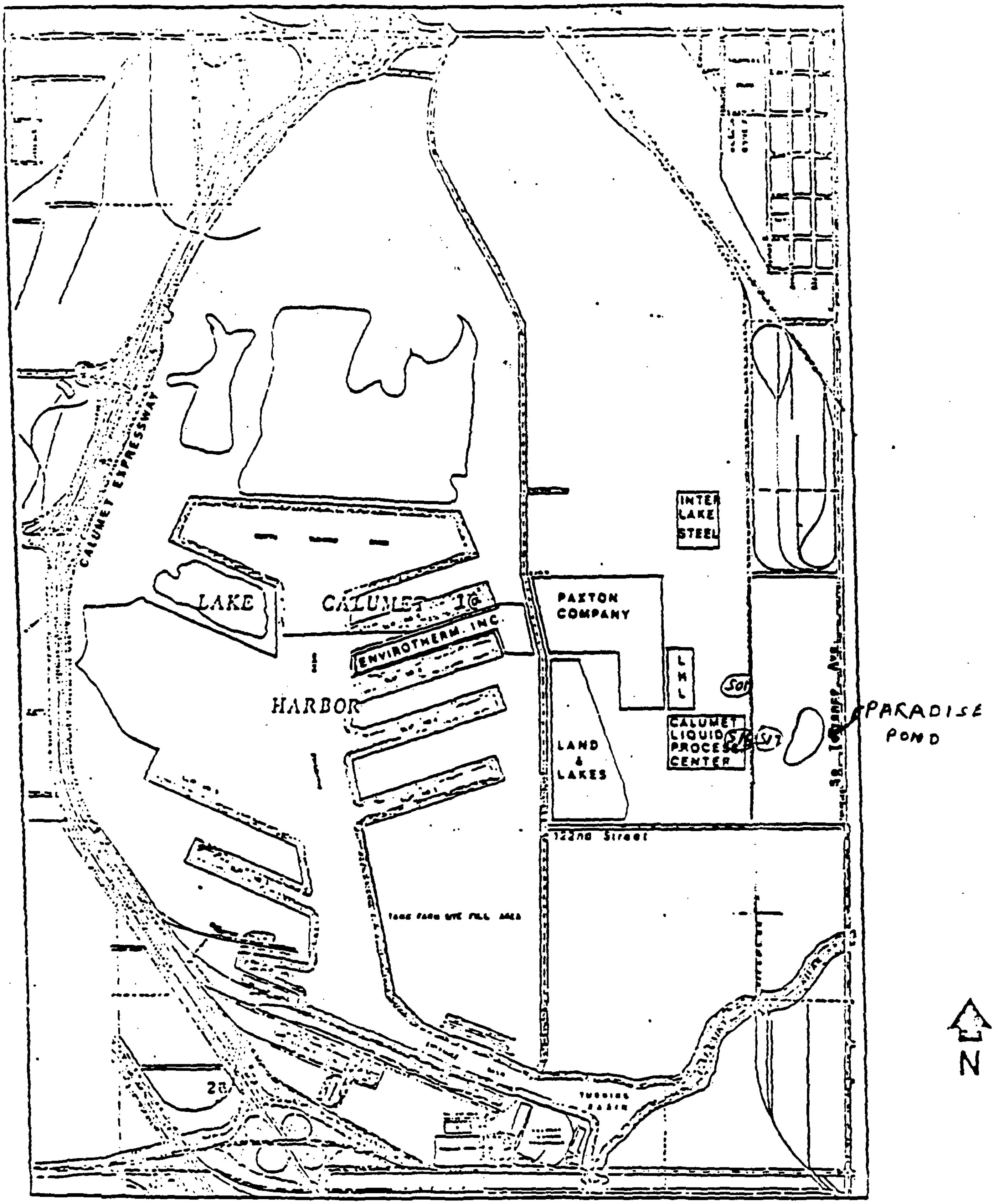
All three of the sampling locations exceeded the Illinois water quality standards for some of the metals. Also a number of organic compound were detected in the two samples from the west side of the railroad tracks, with the northern sample showing the highest concentrations. For these reasons it is recommended that the water on both sides of the railroad tracks not be used for body contact.

W. Sanders

William H. Sanders III, Director

cc: Mary Canavan
Horst Witschonke
Kenneth Fenner

Attachment 1



Industrial Waste Disposal Sites

Appendix J

COMPREHENSIVE PLAN 1984

CHICAGO REGIONAL
PORT DISTRICT

CHICAGO REGIONAL PORT DISTRICT

BOARD OF DIRECTORS

JOHN J. SERPICO, CHAIRMAN
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EPSTEIN CIVIL ENGINEERING, INC.
ENGINEERS

MANN, GIN, EBEL & FRAZIER LTD.
ARCHITECTS

JAMES G. THOMPSON, GOVERNOR
STATE OF ILLINOIS

HAROLD M. WASHINGTON, MAYOR
CITY OF CHICAGO

CHICAGO REGIONAL PORT DISTRICT

JANUARY 20, 1984

TO PUBLIC OFFICIALS AND MEMBERS OF THE PUBLIC,

ON BEHALF OF THE BOARD OF DIRECTORS OF THE CHICAGO REGIONAL PORT DISTRICT, I AM PLEASED TO PRESENT FOR YOUR INFORMATION OUR PROPOSED PLAN FOR THE DEVELOPMENT OF THE PROPERTIES ENTRUSTED TO THE PORT.

ECONOMIC DEVELOPMENT IS THE KEYNOTE OF THE ENTIRE EFFORT. THE VARIOUS PROJECTS PROPOSED MEAN JOBS AND THE GENERATION OF NEW ECONOMIC BASE FOR THE COMMUNITY.

IT IS THE INTENTION OF THE BOARD TO MARSHALL ALL THE TOOLS AVAILABLE TO IT TO ENSURE THE SUCCESS OF THE PROPOSAL. THE PROVISIONS OF THE NEW ENTERPRISE ZONE OFFER CONSIDERABLE ADVANTAGES TO BUSINESS AND WILL SERVE AS PART OF AN ARRAY OF BENEFITS TO PARTICIPANTS. FURTHER, THE DISTRICT CONTEMPLATES THE OFFERING OF INDUSTRIAL REVENUE BONDS AND DEVELOPMENT OF THE POTENTIAL OF THE FOREIGN TRADE ZONE AS PART OF A PROGRAM OF ACTION.

WE LOOK FORWARD TO WORKING WITH BUSINESSES, GOVERNMENTS AND CITIZENS IN BUILDING A VIABLE COMPLEX OF MARITIME, RECREATIONAL, INDUSTRIAL, COMMERCIAL AND TRANSPORTATION SERVICES.

John J. Serpico

JOHN J. SERPICO, CHAIRMAN

HICAGO REGIONAL PORT DISTRICT (312) 646-4400
BUTLER DRIVE-LAKE CALUMET/CHICAGO, IL 60633

INTRODUCTION

CONCEIVED ORIGINALLY IN 1909, THE PLAN FOR CHICAGO'S PORT AND ITS INLAND HARBOR AT LAKE CALUMET WAS BASED ON A SERIES OF ASSUMPTIONS WHICH HELD FOR MANY YEARS. AMONG THESE ASSUMPTIONS WERE THAT CHICAGO WOULD CONTINUE TO GROW AS AN INDUSTRIAL AND MANUFACTURING CENTER, AN EXPORTER AND IMPORTER OF GOODS IN THE WORLD MARKET, AND MAJOR CENTER OF WATERBORNE TRADE. IN RECENT YEARS, THESE ASSUMPTIONS ARE NO LONGER CORRECT, AS CHICAGO,HAS BECOME INCREASINGLY A PROVIDER OF SERVICES AND LESS A MANUFACTURER OF GOODS, AS SHIPPING HAS YIELDED TO THE DOMINANCE OF LAND AND AIR TRANSPORT, AND AS THE ECONOMY HAS READJUSTED TO MORE TEMPERATE INVESTMENT AND ALLOCATION OF RESOURCES.

LAKE CALUMET HARBOR WAS DESIGNED ORIGINALLY IN A FINGER-LIKE SYSTEM OF DOCKS, NEVER COMPLETED, WHICH WOULD ACCOMMODATE LARGE NUMBERS OF SHIPS. BY TODAY'S STANDARDS, THE SHIPS PLANNED FOR ARE SMALL AND DEPENDENT ON MANUAL LABOR AND A LOW ORDER OF TECHNOLOGY. NOT ONLY ARE SHIPPING AND CARGO TRANSFER NEEDS DIFFERENT TODAY, BUT ALSO THE FUNCTION OF THE ORIGINAL PLAN HAS NEVER MET PAST ANTICIPATIONS. AS THE ECONOMY HAS SETTLED INTO NEW PATTERNS, ONE OF THE NEEDS THAT HAS BECOME MORE SHARPLY APPARENT IS THE CONTINUING STRENGTH OF TRADE AND TRANSPORT IN BASIC RAW GOODS - SUCH AS LIMESTONE, FERTILIZERS, COAL, CRUDE PETROLEUM, IRON ORE - WITHIN THE GREAT LAKES AND THE INLAND RIVER SYSTEMS. THIS TYPE OF TRANSPORT REQUIRES BARGES, BULK TERMINAL AND BULK HANDLING SYSTEMS. OTHER WATERBORNE TRADE RELIES MORE HEAVILY ON AN ENTIRELY DIFFERENT FORM OF SHIPPING, ON THE NEWER TECHNOLOGIES OF CONTAINERS, REFRIGERATION, MECHANIZATION.

IN ORDER TO MEET THE CHANGING NEEDS OF WATER TRANSPORT, THE PORT DISTRICT MUST REVAMP SUBSTANTIALLY THE TURN-OF-THE-CENTURY PHYSICAL PLAN FOR LAKE CALUMET. THE NEW PLAN MUST BE RESPONSIVE TO A REALISTIC ANTICIPATION OF TRAFFIC IN TERMS OF VOLUME AND TYPE. IT NEEDS FLEXIBILITY TO ACCOMMODATE CHANGES THAT CANNOT BE ANTICIPATED. FINALLY IT MUST ADDRESS THE ISSUE OF THE PORT'S UNDERDEVELOPED REAL ESTATE.

THE DISTRICT OWNS APPROXIMATELY 3000 ACRES AT IROQUOIS LANDING AND LAKE CALUMET. MOST OF IT SURROUNDS LAKE CALUMET. I-94 RUNS ALONG ITS WESTERN BORDER AND STONEY ISLAND ON ITS EASTERN. RAILROAD LINES SERVE IT. THE PORT'S TERMINAL AND CARGO HANDLING FACILITIES TIE ALL THE VARIOUS FORMS OF TRANSPORTATION TOGETHER. THIS IS THE GREATEST STRENGTH OF THE PROPERTY. THE PROBLEM WHICH MUST BE OVERCOME IS THAT CONSIDERABLE FILL IS NEEDED TO PROVIDE DEVELOPABLE SITES. OTHERWISE, THERE IS TREMENDOUS POTENTIAL FOR MARITIME SUPPORTIVE, MARITIME RELATED AND OTHER DEVELOPMENT THAT STIMULATES THE ECONOMY OF THE COMMUNITY.

THE LONG RANGE VIEW

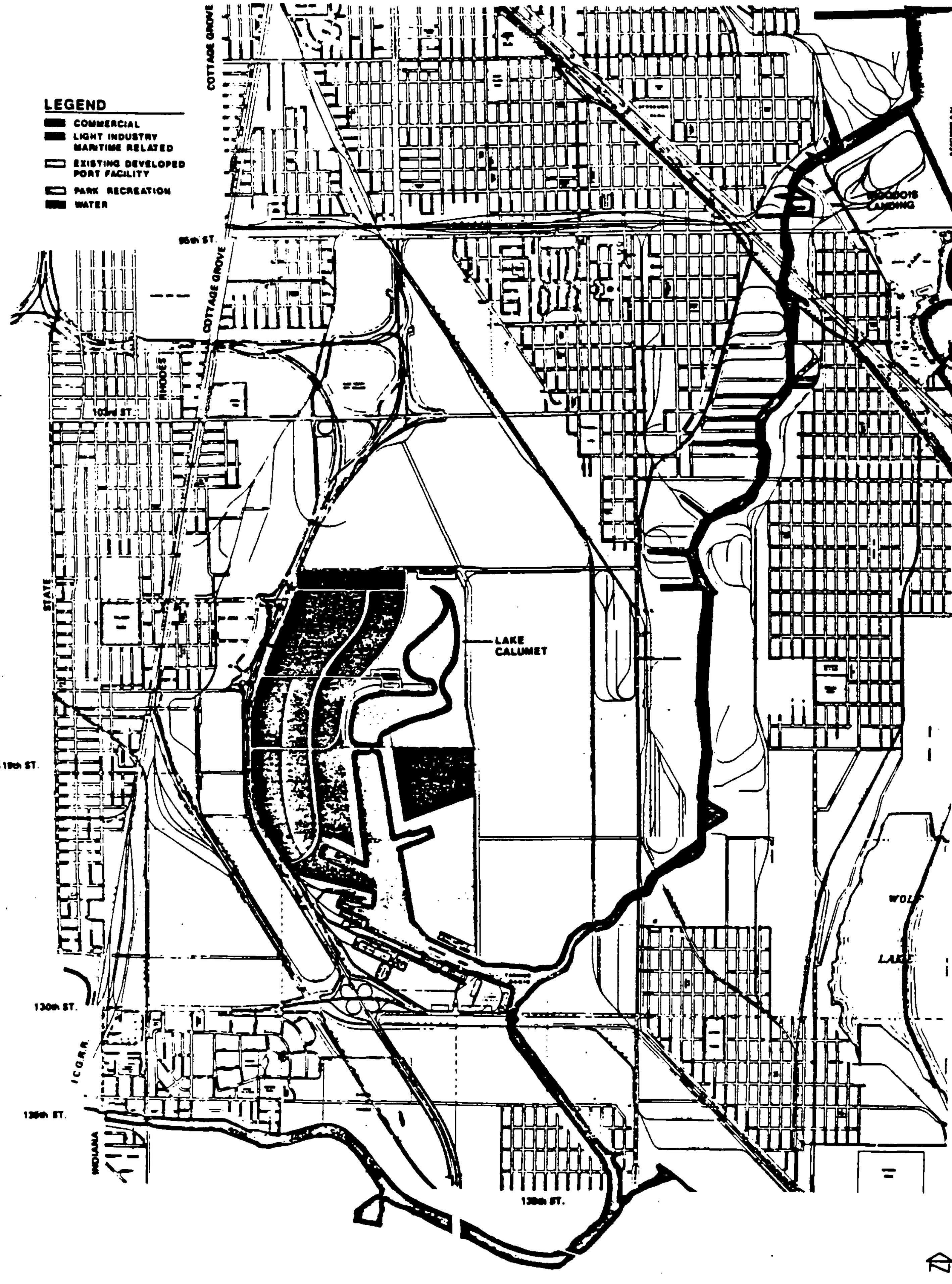
ULTIMATELY, THE PORT DISTRICT'S FACILITIES WILL COMBINE MARITIME, RECREATIONAL, TRANSPORTATION, LIGHT INDUSTRY AND COMMERCIAL NEEDS IN A COMPLEMENTARY AND AESTHETIC MIX.

THE CHANNEL AND CENTER OF LAKE CALUMET WILL BE LONGER, DEEPER AND WIDER THAN AT PRESENT IN ORDER TO ACCOMMODATE SHIPPING, CARGO HANDLING, AND TRANSFER MORE EFFICIENTLY AND EFFECTIVELY. SITES FOR VARIOUS TYPES OF BULK TERMINAL FACILITIES WOULD BE CLOSE AT HAND FOR STORAGE, AND SPACE WILL BE AVAILABLE FOR LIGHT MANUFACTURING OR ASSEMBLY OR TRANSFER AS NEEDED. THIS FORM OF MARITIME SUPPORT WILL CONSTITUTE THE FIRST ''LAYER'' AROUND THE NEW LAKE CALUMET.

AT THE NORTH END OF THE LAKE A MARINA AND RECREATIONAL AREA WILL SERVE THE PUBLIC IN A LAGOON SETTING. THE GOLF COURSE TO THE NORTH WILL SERVE AS A BACKDROP FOR THE SETTING AND WILL AUGMENT THE RECREATIONAL AMENITIES. THROUGHOUT, LANDSCAPING WILL REFLECT THE NATURAL ENVIRONMENT OF WETLANDS AND THE NATIVE FLORA AND FAUNA. NEW TECHNOLOGIES WILL BE UTILIZED TO CREATE A CLEAN, SAFE, VISUALLY APPEALING SITE SYMBIOTIC WITH THE ENVIRONMENT.

A SECOND LAYER AROUND THE BASIC CORE DESCRIBED ABOVE WILL PROVIDE SERVICES TO IT AS WELL AS THE NEXT LAYER WHICH WILL BE COMMERCIAL IN NATURE. THIS SERVICE STRIP WILL CONTAIN RAIL AND ROAD ACCESS, WATER, SEWERS, AND OTHER UTILITIES. IT WILL MOVE PEOPLE AND GOODS TO AND FROM THE VARIOUS FUNCTIONS. ON THE EAST SIDE OF THE LAKE THE SAME CONCEPT WILL BE APPLIED ALONG STONEY ISLAND.

THE COMMERCIAL LAYER WILL LIE PRIMARILY ALONG I-94 AND UTILIZE CURRENT ACCESS AT 111TH AND 115TH STREETS. IT WILL BE HIGHWAY ORIENTED. EXAMPLES OF THE TYPES OF BUSINESSES WHICH MIGHT BE FOUND HERE INCLUDE A TRUCK STOP AND TRUCK TERMINAL, AND RESTAURANTS, AT 111TH. A HOTEL OR MOTEL IS ENVISIONED IMMEDIATELY TO THE NORTH. TO THE SOUTH, OFF 115TH, VARIOUS TYPES OF COMMERCIAL OPERATIONS ARE ENVISIONED. EVENTUALLY, EXTENSION OF 111TH ALL THE WAY TO TORRENCE WOULD COMPLETE HIGH ACCESSIBILITY TO TRANSPORTATION THAT IS THE HALLMARK OF THE ENTIRE AREA.



CHICAGO REGIONAL PORT DISTRICT

MASTER PLAN 1984

PHASE I

THE COMMERCIAL STRIP ALONG I-94 WILL UTILIZE CURRENT ACCESS AT 111TH AND 115TH STREETS WHICH IS ADEQUATE FOR THE NEEDS. AMONG THE VARIOUS SERVICES TO BE OFFERED ARE CONTEMPLATED A TRUCK STOP AND TRUCK TERMINAL OF APPROXIMATELY 45 ACRES. THERE WILL BE A RESERVE ACREAGE IMMEDIATELY TO THE EAST FOR POTENTIAL EXPANSION IF AND AS NEEDED. THE CONFIGURATION OF THE FACILITY AND THE ATTENDANT LANDSCAPING WILL BE SPECIFICALLY PLANNED TO PROVIDE AN AESTHETICALLY PLEASING ASPECT TO THE COMMUTER ON THE EXPRESSWAY AND WILL REFLECT APPROPRIATELY THE GOLF COURSE FURTHER TO THE NORTH.

THE HOTEL OR MOTEL OPERATION WOULD BE IMMEDIATELY TO THE NORTH NEXT TO THE GOLF COURSE SO THAT THE TWO RESTFUL AREAS COMPLEMENT EACH OTHER.

PHASE II

SOUTHWARD, DRAWING ON THE 115TH STREET ACCESS WILL BE THE COMMERCIAL AREA. THE DEVELOPMENT WILL PROVIDE FOR POSSIBLE USES SUCH AS WAREHOUSE FOOD OPERATIONS, DISCOUNT STORES, HOME APPLIANCE, HARDWARE, AUTO EQUIPMENT AND LIKE OUTLETS WHICH WILL STRONGLY ATTRACT THE COMMUTER. PARKING AREAS WILL BE PLENTIFUL AND PROVIDED BY EACH DEVELOPMENT.

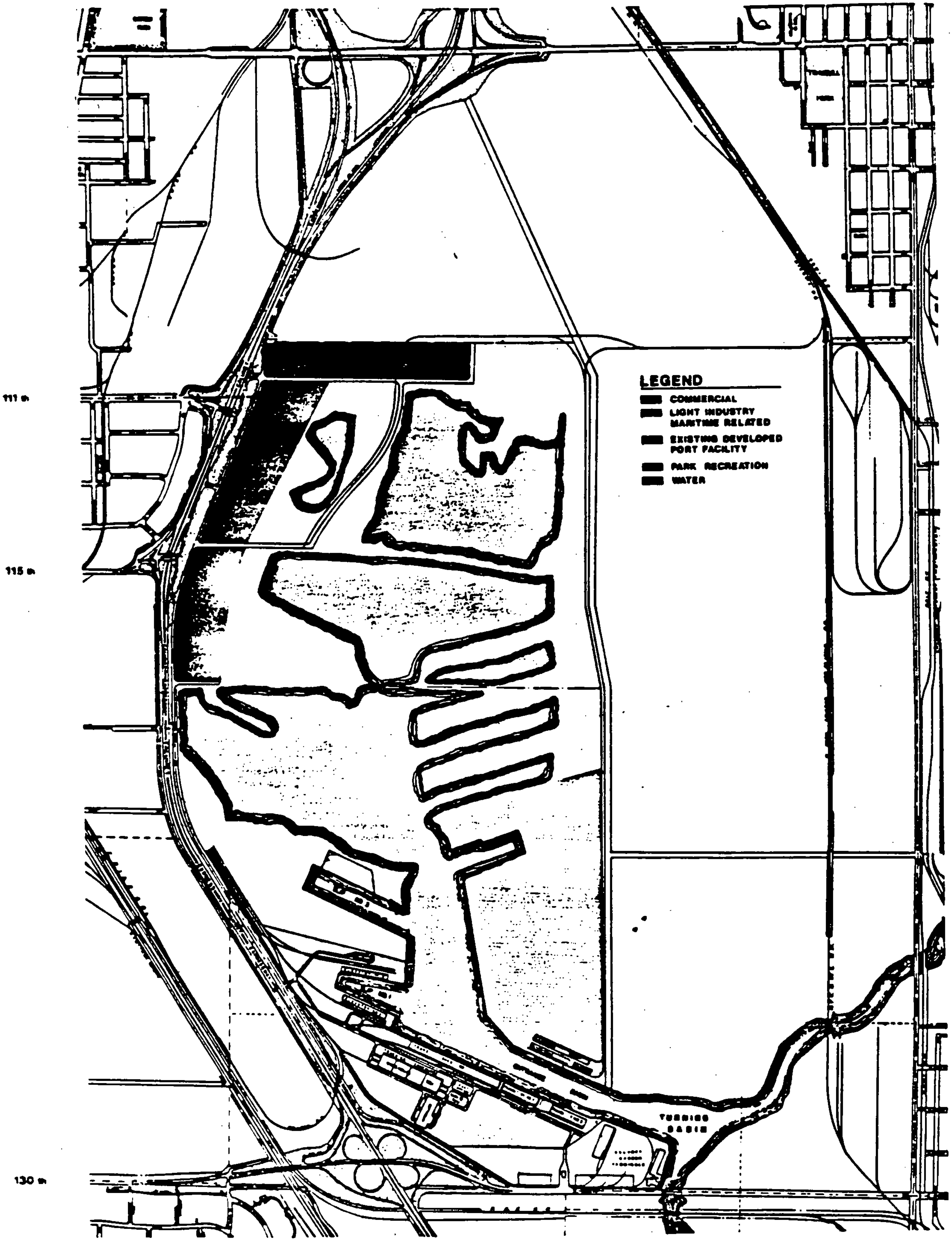
DEVELOPMENT WILL BEGIN FOR THE PARK AREA AND THE MARINA TO THE EAST. THE MARINA WILL SERVE APPROXIMATELY 800 BOATS.

AS RECLAMATION OF LAND BECOMES FEASIBLE, GROWTH WILL CONTINUE SOUTHWARD WITH COMMERCIAL DEVELOPMENT AND EASTWARD FOR LIGHT INDUSTRY APPLICATIONS.

PHASE III

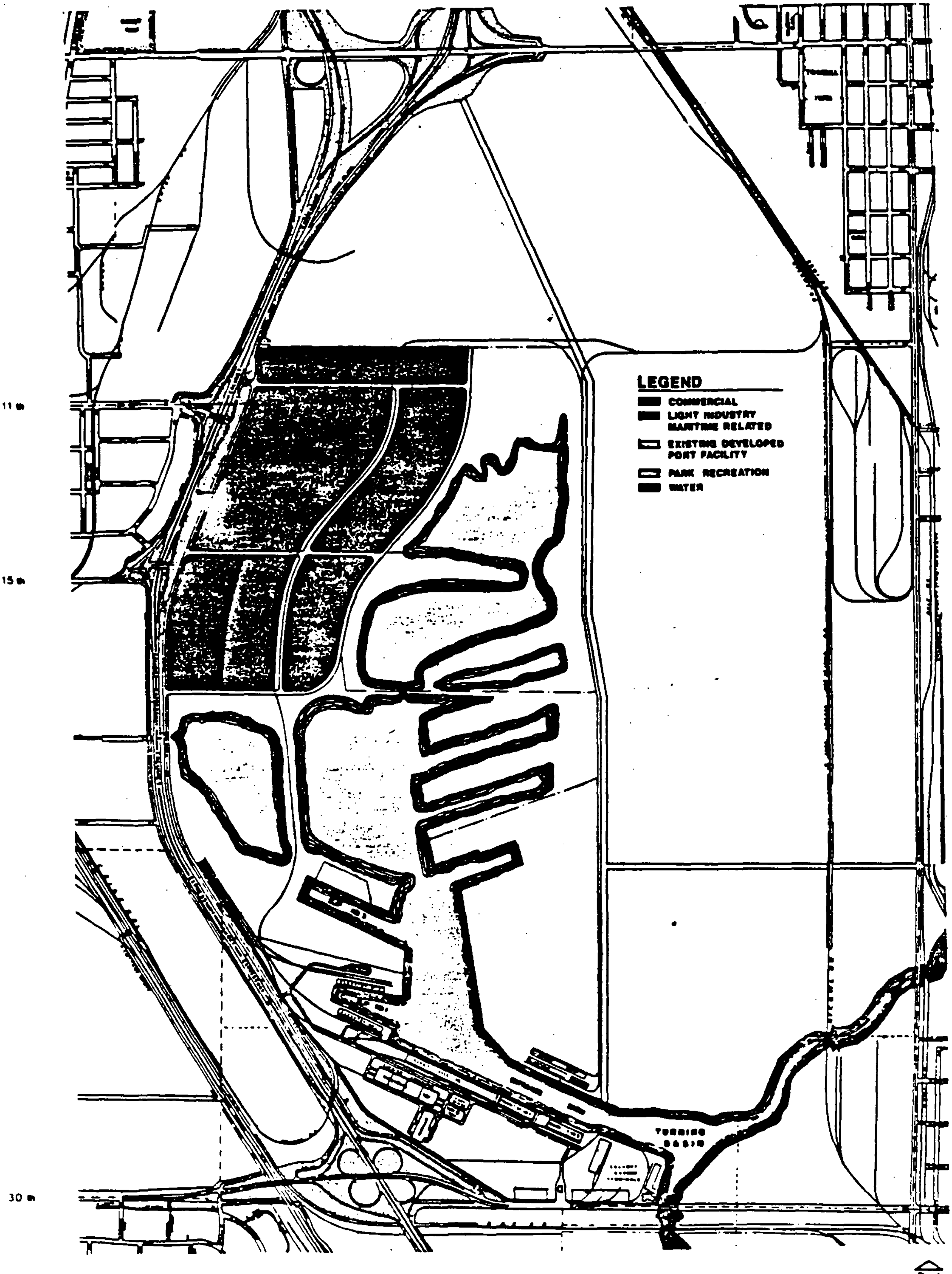
THE PARK AREA WILL BE COMPLETED. GREAT EMPHASIS WILL BE PLACED ON PRESERVATION OF THE NATURAL ENVIRONMENT OF THE WETLANDS. A RELAXING AREA FOR MARINE USERS, SHOPPERS AND PASSERSBY, IT WILL ULTIMATELY OCCUPY ABOUT 20% OF THE ENTIRE AREA.

COMMERCIAL DEVELOPMENT WILL PROCEED SOUTHWARD ALONG I-94 AND MARITIME AND INDUSTRIAL FACILITIES TO THE EAST AS LAND IS RECLAIMED.



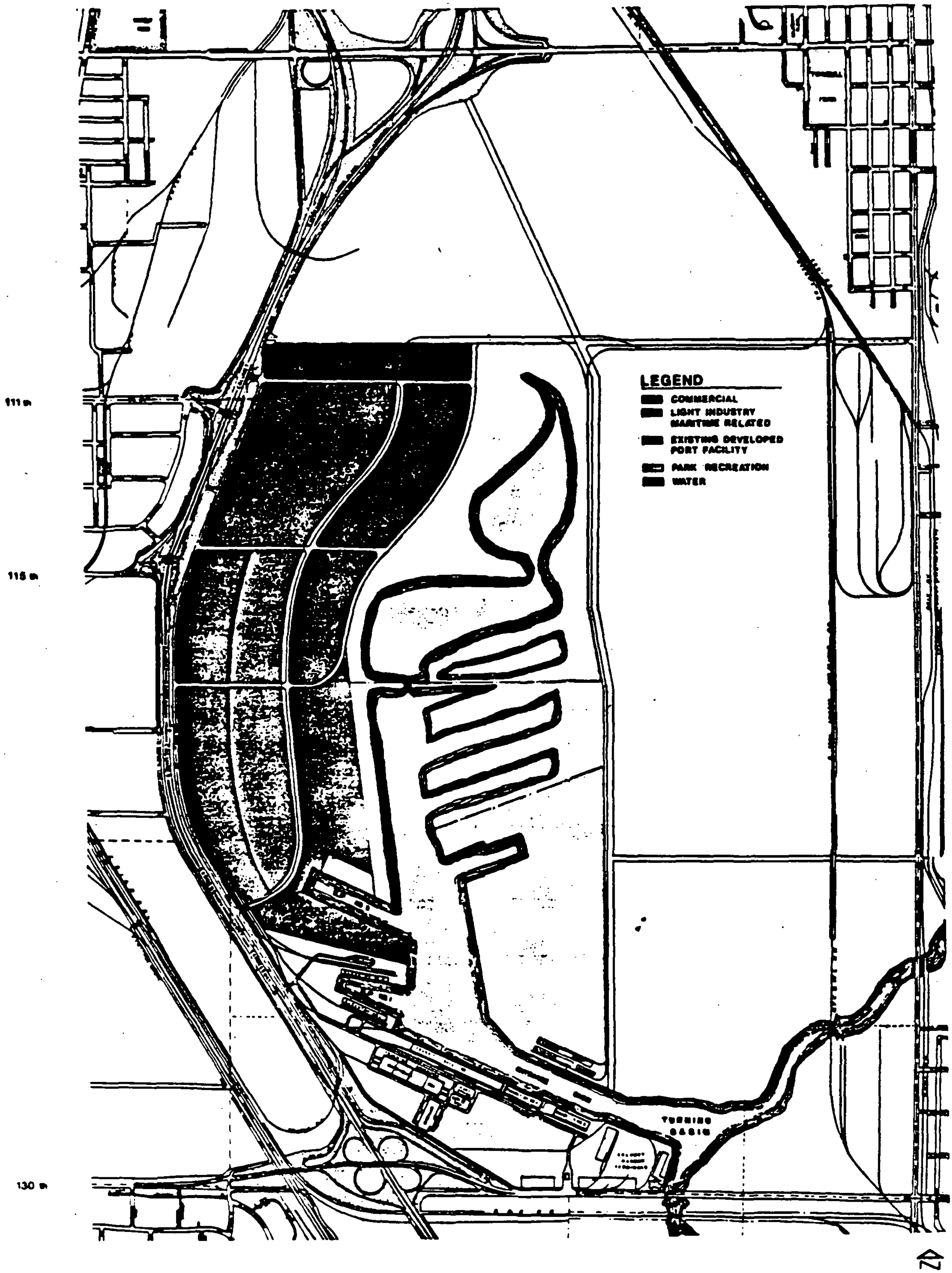
PHASE I

CHICAGO REGIONAL PORT DISTRICT



PHASE II

CHICAGO REGIONAL PORT DISTRICT



PHASE III

CHICAGO REGIONAL PORT DISTRICT

PLANNING ELEMENTS

ENVIRONMENT - RECREATION

IN KEEPING WITH ENVIRONMENTAL STUDIES ALREADY CONDUCTED AND THE ADVICE OF EXPERTS, THE DEVELOPMENT PLANNED WILL NOT HARM OR DISPLACE ANY SIGNIFICANT NATURAL RESOURCES. FURTHER, THE DESIGN OF THE AREA WILL BE ORIENTED SPECIFICALLY TO PRESERVATION AND AUGMENTATION OF THE WETLANDS, THE NATIVE FOWL, ANIMAL AND AQUATIC INHABITANTS, THE NATIVE GRASSES, FLOWERS AND SO ON. THIS WILL BE A RATHER SIZEABLE AREA CONSTITUTING ABOUT 20% OF THE PORT'S PROPERTIES AT LAKE CALUMET.

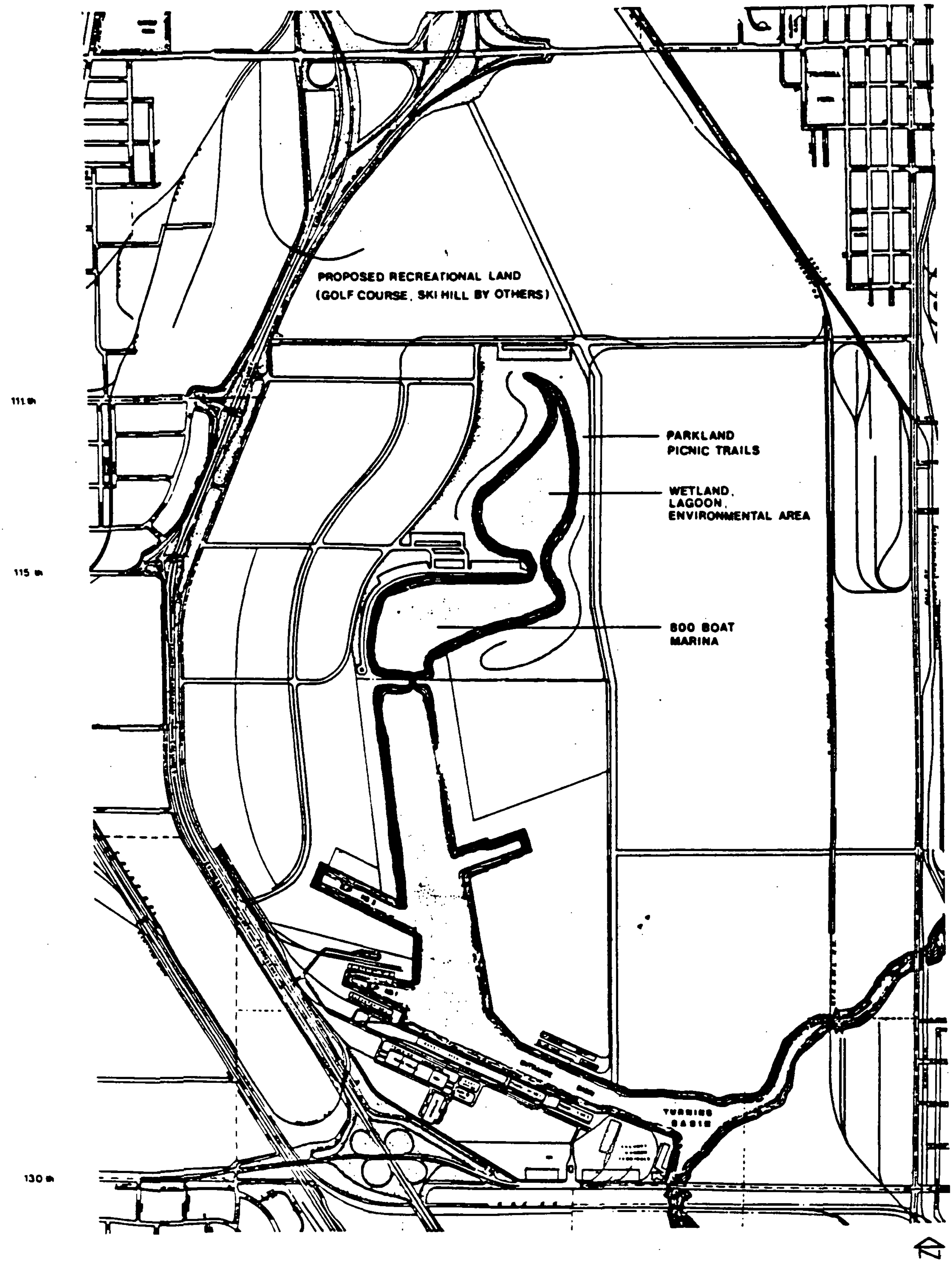
TRAFFIC

THE SYSTEM OF CIRCULATION OF TRAFFIC DESIGNED FOR LAKE CALUMET IS BASED ON THE ALREADY ADVANTAGEOUS CONFIGURATION OF ACCESS ROUTES, NAMELY I-94 AND ITS EXIT RAMPS, THE RAILROAD SPURS AND OTHER INTERNAL CONNECTIONS AVAILABLE NOW. THE SERVICE CORE OF ROAD AND RAIL ACCESS NOTED IN THE EXHIBIT WILL EXTEND AND AMPLIFY THE CURRENT TRANSPORTATION CONFIGURATION. THE DESIGN EMPHASIZES INTERACTION OF ROAD, RAIL AND WATER TRANSPORTATION AND TIES THE THREE TOGETHER IN THE INTEREST OF SERVING MARITIME, RECREATIONAL, INDUSTRIAL AND COMMERCIAL APPLICATIONS.

INFRASTRUCTURE

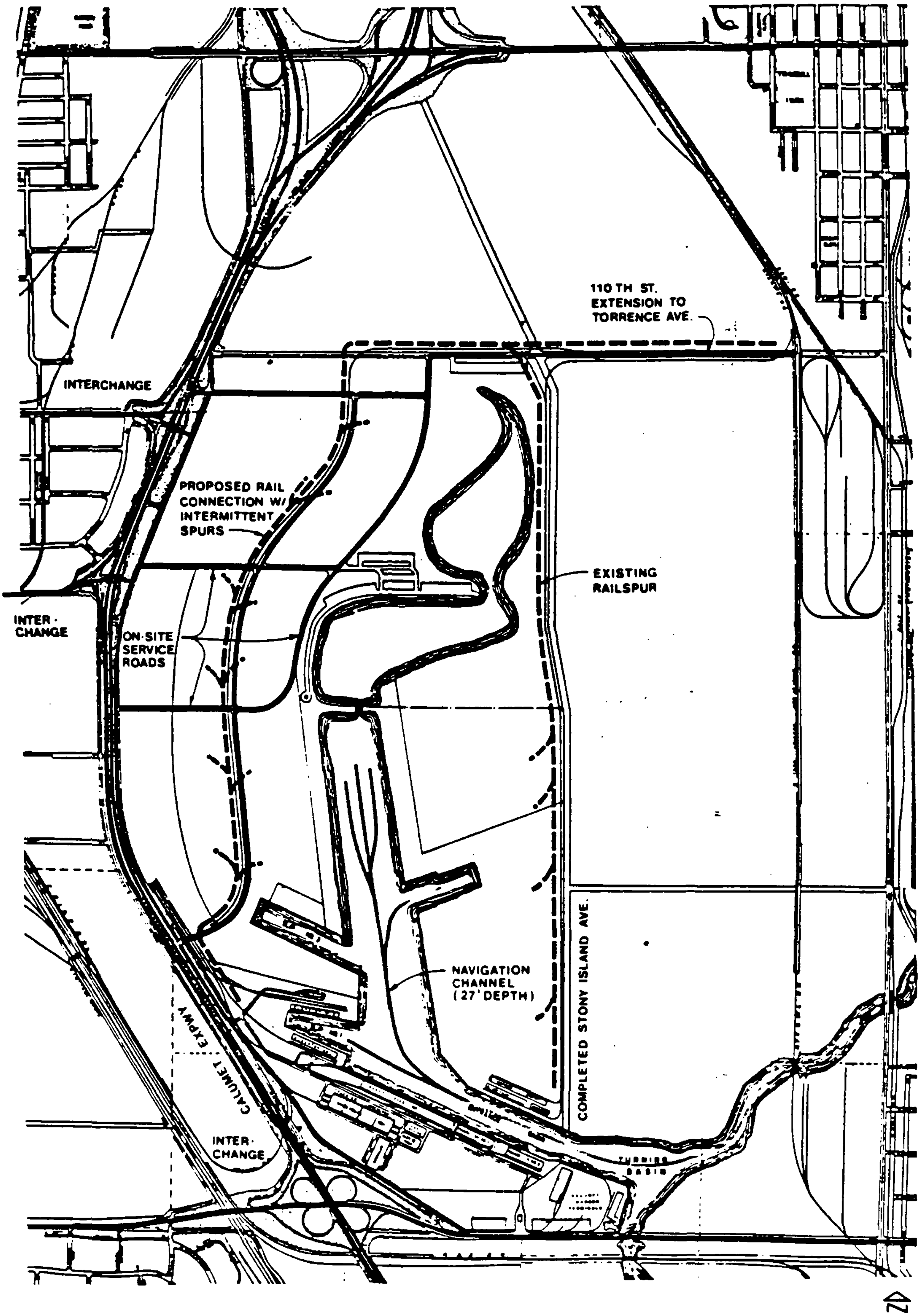
AT PRESENT WATER SERVICE IS AVAILABLE THROUGH A 42" MAIN ALONG COTTAGE GROVE TO THE WEST AND A 12" MAIN ON 122ND STREET FROM THE EAST THAT PROCEEDS SOUTH ON STONEY ISLAND. EXISTING SEWERS ARE ON 111TH AND THE SOUTH END OF STONEY ISLAND.

THE FOLLOWING EXHIBIT SHOWS EXTENSIONS OF THE WATER MAIN ON THE WEST ALONG 111TH AND 115TH STREETS, AND A SANITARY SEWER CONNECTION IN 111TH TO SERVE THE WEST SIDE OF THE DEVELOPMENTS PROPOSED. SERVICE ON THE EAST SIDE WILL BE SERVED BY THE CONNECTIONS SHOWN AT 122ND AND STONEY ISLAND. AS REQUIRED BY THE METROPOLITAN SANITARY DISTRICT, SEPARATE STORM DETENTION WILL BE PROVIDED BY EACH DEVELOPMENT.

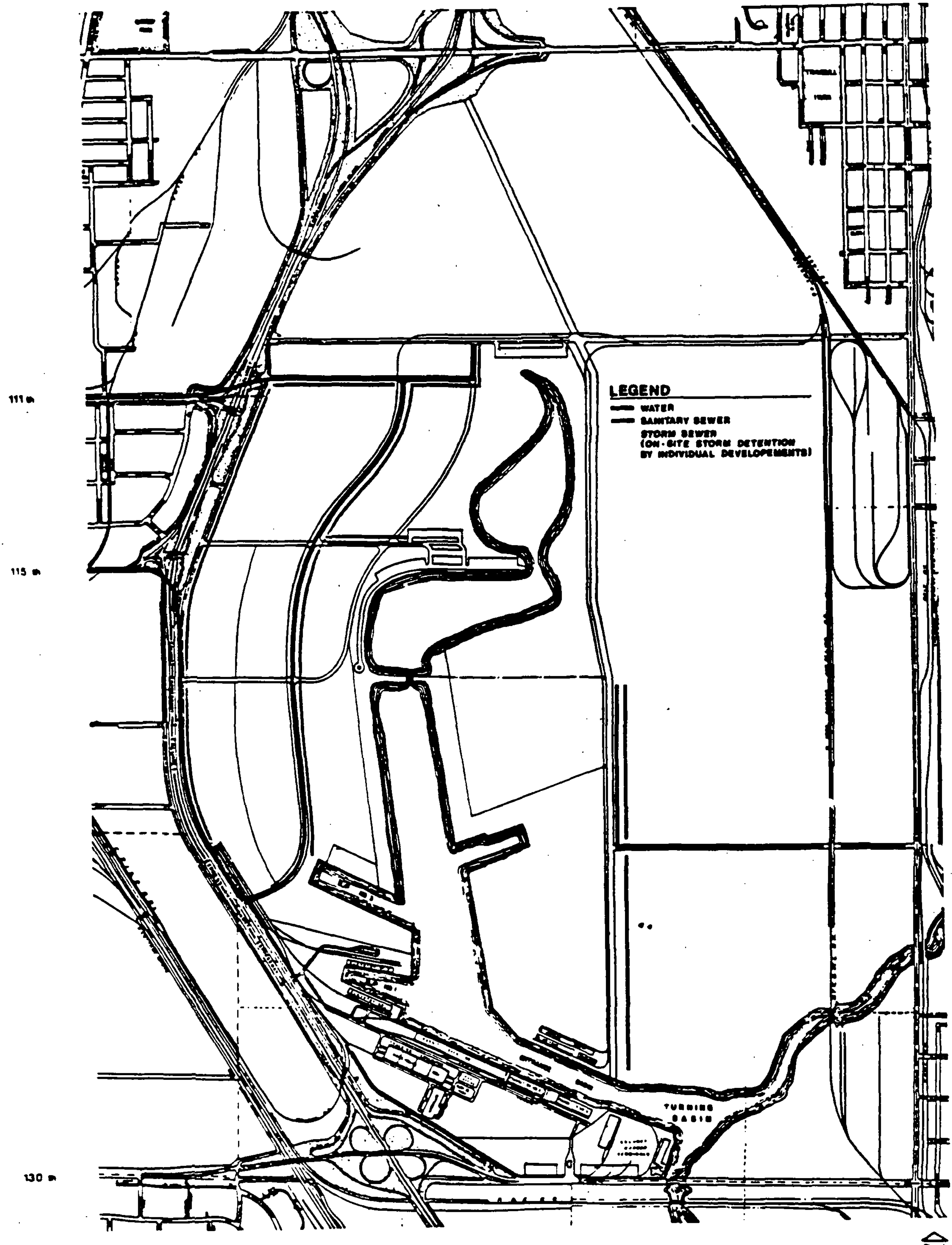


PLANNING ELEMENTS

CHICAGO REGIONAL PORT DISTRICT



PLANNING ELEMENTS



PLANNING ELEMENTS
INFRASTRUCTURE

CHICAGO REGIONAL PORT DISTRICT

CONCLUSION

IN SUMMARY, THE PLAN CONTAINS THE FOLLOWING KEY ELEMENTS

- IT MAXIMIZES THE POTENTIAL OF THE LAKE CALUMET AREA AS A TRANSPORTATION CENTER PROVIDING COST-EFFICIENT, MULTI-MODAL SERVICES
- BY REARRANGING TERMINAL AND CARGO-HANDLING FACILITIES, MARITIME OPERATIONS WILL MEET CURRENT NEEDS MORE EFFECTIVELY AND WILL BE PREPARED TO MEET FUTURE DEVELOPMENTS IN SHIPPING
- SIGNIFICANT ENVIRONMENTAL RESOURCES WILL BE PRESERVED AND SAFEGUARDED WITHIN A PARK-LIKE SETTING
- SPACE FOR LIGHT INDUSTRY WILL SUPPORT MARITIME OPERATIONS AND ENCOURAGE INCREASE IN TRADE
- THE MARINA AND RELATED RECREATIONAL FACILITIES WILL ADD A NEW DIMENSION IN A COMMUNITY WHERE SUCH AMMENITIES ARE FEW
- THE COMMERCIAL DEVELOPMENTS ON THE WEST SIDE WILL PROVIDE GOOD LOCATION FOR THAT CATEGORY OF BUSINESS DUE TO ACCESSIBILITY AND VISIBILITY AS WELL AS LITTLE COMPETITION FROM NEARBY AREAS
- THE PARTICULAR MIX OF DEVELOPMENTS AND THE SUBSTANTIAL GREENSPACE INTERACTING IN A NEW WAY WITH LAKE CALUMET WILL IMPROVE SIGNIFICANTLY THE VISUAL IMPACT OF THE AREA AND THE QUALITY OF LIFE THERE IN GENERAL

BUT MOST IMPORTANT TO ALL IS THAT THE NEW COMPLEX OF MARITIME, RECREATIONAL, INDUSTRIAL, COMMERCIAL AND TRANSPORTATION OPERATIONS WILL PROVIDE A SIGNIFICANT DEVELOPMENT TO THE ECONOMY OF THE SOUTH SIDE AND CHICAGO.

Appendix K

Illinois Environmental Protection Agency

BORING NO.	WELL NO.	GROUNDLEVEL ELEV.	PAGE	OF
Bnd 3	—		1	1

COUNTY	SITE NO.
Cook	—

SITE: South Side Chicago Study

BORING LOCATION: Luella Playground School

DRILLING EQUIPMENT: Post hole digger | SIZE | TYPE

COMPLETION DEPTH: 2.0 ft. | BEDROCK DEPTH | TOP OF CASING

DATE	
START	FINISH
8-21-84	8-21-84

TIME	
START	FINISH
1:15P	1:35P

ANNULUS FILL MATERIAL

ABOVE PACKING

PACKING

SCREEN

WELL CASING — TYPE AND QUANTITY

SCREEN INTERVAL — TYPE AND QUANTITY

PERSONNEL
- L- J Ehrat
- D- D. Tolan
- H- K. Bosie

ELEV.	DESCRIPTION	DEPTH	Sample No.	Sampler Type	Sample Recovery Ft.	Penetrometer (Strength)	N Value (Blows)	REMARKS
	0.0 - 2.0 sand, light brn, med. to fine grained, some roots	0 – 2	3A + 3B					dug 2.0ft
	Note: Sample 3A - tested for Metals acid digest. (Selenium) Sample 3B - tested for EP Toxicity							
	★ Sample collected at 2.0ft							

Time Collected: 1:15 P

Lab # C01029 AUG22'84

SPECIAL ANALYSIS FORM

Date Collected: 8-21-84

Date Received 8-21-84

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
DIVISION OF LAND/NOISE POLLUTION CONTROL

COUNTY:	FILE HEADING:	FILE NUMBER:
Cook		

SOURCE OF SAMPLE: (Exact Location)

Grid #3 Luella Playground School

3A

smpld - @ 2'

PHYSICAL OBSERVATIONS, REMARKS: soil

TESTS REQUESTED: Metal acid digest

COLLECTED BY: [signature]

TRANSPORTED BY: [signature]

LABORATORY

RECEIVED BY: [signature]

DATE COMPLETED:

DATE FORWARDED:

Selenium 4.3 ~~mg/kg~~ (μg/gram)

J Daugherty

RESULTS EXPRESSED IN
MICROGRAMS PER GRAM
OF SAMPLE (P.P.M.).
DRY WEIGHT BASIS UNLESS
OTHERWISE SPECIFIED.

RECEIVED
JAN 25 1985
IEPA-DLPC

IL 532-0314
LPC 8A 4/77

C001029 (NOT FOR DATA PROCESSING)

Environmental Protection Agency
Division of Laboratory Services
2121 W. Taylor Street
Chicago, Illinois 60612

Time Collected: 1:15P

Date Collected: 8-21-84

SPECIAL ANALYSIS FORM

Lab # C01030 AUG22'84

Date Received 8-21-84

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
DIVISION OF LAND/NOISE POLLUTION CONTROL

COUNTY:	FILE HEADING:	FILE NUMBER:
Cook		

SOURCE OF SAMPLE: (Exact Location)

Grid #3 Luella Playground School sampled from 2.0'-2.2'

3B

PHYSICAL OBSERVATIONS, REMARKS: soil

TESTS REQUESTED: EP Toxicity

COLLECTED BY: [signature] TRANSPORTED BY: [signature]

LABORATORY

RECEIVED BY: [signature] DATE COMPLETED: DATE FORWARDED: OCT 10 1984

Selenium - 0.028

(0.028)

RESULTS EXPRESSED IN MG/LITER UNLESS OTHERWISE SPECIFIED.

[signature] J Daugherty

Initial pH 9.7

Final pH 5.0

RECEIVED
OCT 11 1984
IEPA-DLPC

IL 532-0314
LPC 8A 4/77

C001030 (NOT FOR DATA PROCESSING)

Environmental Protection Agency
Division of Laboratory Services
2121 W. Taylor Street
Chicago, Illinois 60612

Illinois Environmental Protection Agency

BORING NO.	WELL NO.	GROUNDLEVEL ELEV.	PAGE	OF
Brad 8	-		1	1

COUNTY	Cook
SITE NO.	
SITE	South Side Chicago Study
BORING LOCATION	Bright School
DRILLING EQUIPMENT	Post hole digger
SIZE	
TYPE	
COMPLETION DEPTH	2.0 ft.
BEDROCK DEPTH	
TOP OF CASING	
DATE START	8-21-84
DATE FINISH	8-21-84
TIME START	1:50P
TIME FINISH	2:05P
ANNULUS FILL MATERIAL ABOVE PACKING	
PACKING	
SCREEN	
WELL CASING TYPE AND QUANTITY	
SCREEN INTERVAL TYPE AND QUANTITY	

PERSONNEL
L- J. Ehrat
D- D. Tolan
H- K. Bosie

ELEV.	DESCRIPTION	DEPTH	SAMPLES: Sample No.	Sampler Type	Sample Recovery Ft.	Penetrometer (Strength)	N Value (Blows)	REMARKS
	0.0 - 0.4 Silt, grey to black, tight	0						
	0.4 - 2.0 Sand, brown, assorted sizes of grains	1	8A + 8B					
		2						dug 2.0 ft.

Note Sample 8A
- tested for Metals Acid Digest. (Selenium)

Sample 8B
- tested for E.P Toxicity

★ Sample collected from 6" to 2'

Time Collected: 1:50P

Lab # C01031 AUG22 '84

SPECIAL ANALYSIS FORM

Date Collected: 8-21-84

Date Received 8-21-84

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
DIVISION OF LAND/NOISE POLLUTION CONTROL

COUNTY:	FILE HEADING:	FILE NUMBER:
Cook		

SOURCE OF SAMPLE: (Exact Location)

Grid #8 Bright School

8A

PHYSICAL OBSERVATIONS, REMARKS: soil

TESTS REQUESTED: Metal acid digest

COLLECTED BY: [signature] TRANSPORTED BY: [signature]

LABORATORY

RECEIVED BY: [signature] DATE COMPLETED: DATE FORWARDED:

Selenium 5.8 mg/kg (μg/gram) J Daugherty

RESULTS EXPRESSED IN MICROGRAMS PER GRAM OF SAMPLE (P.P.M.). DRY WEIGHT BASIS UNLESS OTHERWISE SPECIFIED.

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LPC 8A 4/77

C001031 (NOT FOR DATA PROCESSING)

Time Collected: 1:50P

Lab # C01032 AUG22

SPECIAL ANALYSIS FORM

Date Collected: 8-21-84

Date Received 8-21-84

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
DIVISION OF LAND/NOISE POLLUTION CONTROL

COUNTY:	FILE HEADING:	FILE NUMBER:
Cook		

SOURCE OF SAMPLE: (Exact Location)

Grid #8 Bright School sampled from 6" to 2'

8B

PHYSICAL OBSERVATIONS, REMARKS: soil

TESTS REQUESTED: EP Toxicity

COLLECTED BY:

TRANSPORTED BY:

LABORATORY

RECEIVED BY:

DATE COMPLETED:

DATE FORWARDED: OCT. 10. 1984

Selenium

J Daugherty

Selenium — 0.039

RESULTS EXPRESSED IN MG/LITER UNLESS OTHERWISE SPECIFIED.

Initial pH 9.3

Final pH 5.1

RECEIVED
OCT 11 1984
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Division of Laboratory Services
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Chicago, Illinois 60612

IL 532-0314
LPC 8A 4/77

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C001032

Illinois Environmental Protection Agency

BORING NO.	WELL NO.	GROUNDLEVEL ELEV.	PAGE	OF
Grid 10	-		1	1

COUNTY	SITE NO.	DATE START	DATE FINISH	ANNULUS FILL MATERIAL
Cook		8-21-84	8-21-84	ABOVE PACKING:
SITE: South Side Chicago Study				PACKING:
BORING LOCATION: Adams Elementary School		TIME START	TIME FINISH	SCREEN:
DRILLING EQUIPMENT: Post hole digger	SIZE:	TYPE: 2:20P	2:35P	

COMPLETION DEPTH	BEDROCK DEPTH	TOP OF CASING
1.3 ft.		

WELL CASING — TYPE AND QUANTITY

SCREEN INTERVAL — TYPE AND QUANTITY

PERSONNEL
L. J. Ehrat
D. D. Tolan
H. K. Bosie

ELEV.	DESCRIPTION	DEPTH	Sample No.	Sampler Type	Sample Recovery Ft.	Penetrometer (Strength)	N Value (Blows)	REMARKS
	0.0-1.3 Silt, sand, and Gravel, dark brown to black 0.9-1.3 Cinders	0 1	10A + 10B					dug 1.3 ft.
	Note: Sample 10A - tested for Metals Acid Digest (Selenium) Sample 10B - tested for EP Toxicity ★ Sample collected from 6" to 1.3'	2						

Time Collected: 2:20 P

Date Collected: 8-21-84

Lab # C01033 AUG22'84

SPECIAL ANALYSIS FORM

Date Received 8-21-84

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
DIVISION OF LAND/NOISE POLLUTION CONTROL

COUNTY:	FILE HEADING:	FILE NUMBER:
Cook		

SOURCE OF SAMPLE: (Exact Location)

Grid #10 Adams Elementary School Playground

10A

PHYSICAL OBSERVATIONS, REMARKS: soil

TESTS REQUESTED: Metal acid digest

COLLECTED BY: Jane Ehat TRANSPORTED BY: Jane Ehat

LABORATORY

RECEIVED BY: M Kulamay DATE COMPLETED: DATE FORWARDED:

Selenium 1.8 mg/kg (µg/gram) Daugherty

RESULTS EXPRESSED IN MICROGRAMS PER GRAM OF SAMPLE (P.P.M.). DRY WEIGHT BASIS UNLESS OTHERWISE SPECIFIED.

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Chicago, Illinois 60612

Time Collected: 2:20P

Lab # C01034 AUG22

SPECIAL ANALYSIS FORM

Date Collected: 8-21-84

Date Received 8-21-84

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
DIVISION OF LAND/NOISE POLLUTION CONTROL

COUNTY:	FILE HEADING:	FILE NUMBER:
Cook		

SOURCE OF SAMPLE: (Exact Location)

Grid #10 Adams Elementary School Playground

10B sampled from 6" to 1.3'

PHYSICAL OBSERVATIONS, REMARKS: Soil

TESTS REQUESTED: E P Toxicity

COLLECTED BY: Jane Ehrat TRANSPORTED BY: Jane Ehrat

LABORATORY

RECEIVED BY: [signature] DATE COMPLETED: DATE FORWARDED: OCT. 10, 1984

Selenium -0.054

J Daugherty

RESULTS EXPRESSED IN MG/LITER UNLESS OTHERWISE SPECIFIED.

Initial pH 9.1

Final pH 5.0

RECEIVED
OCT 11 1984
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C001034

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Chicago, Illinois 60612

Illinois Environmental Protection Agency

BORING NO.	WELL NO.	GROUNDLEVEL ELEV.	PAGE	OF
Grid 14	–		1	1

COUNTY	Cook
SITE NO.	
SITE	South Side Chicago Study
BORING LOCATION	Republic Steel
DRILLING EQUIPMENT	Tile Spade
SIZE	
TYPE	
COMPLETION DEPTH	6"
BEDROCK DEPTH	
TOP OF CASING	
DATE START	8-21-84
DATE FINISH	8-21-84
TIME START	3:10P
TIME FINISH	3:30P
ANNULUS FILL MATERIAL – ABOVE PACKING	
PACKING	
SCREEN	
WELL CASING – TYPE AND QUANTITY	
SCREEN INTERVAL – TYPE AND QUANTITY	

PERSONNEL
L- J. Ehrat
D- D. Tolan
H- K. Bosie

SAMPLES

ELEV.	DESCRIPTION	DEPTH	Sample No.	Sampler Type	Sample Recovery Ft.	Penetrometer (Strength)	N Value (Blows)	REMARKS
	0.0-0.5 Fly Ash, grey to black	0	14A 14B					dug 6"
		1						

Note: Sample 14A
- tested for Metals Acid Digest (Selenium, Chromium)

Sample 14B
- tested for EP Toxicity

☆ Sample collected from 0 to 6"

Time Collected: 3:10 P

Date Collected: 8-21-84

SPECIAL ANALYSIS FORM

Lab # C01035 AUG22

Date Received 8-21-84

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
DIVISION OF LAND/NOISE POLLUTION CONTROL

COUNTY:	FILE HEADING:	FILE NUMBER:
Cook		

SOURCE OF SAMPLE: (Exact Location)

Grid #14 Republic Steel 0-6"

14A

PHYSICAL OBSERVATIONS, REMARKS: soil

TESTS REQUESTED: Metal acid digest

COLLECTED BY: Jane Ehrat TRANSPORTED BY: Jane Ehrat

LABORATORY

RECEIVED BY: M Zulamay DATE COMPLETED: DATE FORWARDED:

Selenium - 1.8 mg/kg } µg/gram J Daugherty

Chromium - 1921 mg/kg }

RESULTS EXPRESSED IN
~~MICROGRAMS PER GRAM~~
OF SAMPLE (P.P.M.).
~~DRY WEIGHT BASIS UNLESS~~
OTHERWISE SPECIFIED.

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LPC 8A 4/77

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Time Collected: 3:10 P

Lab # C01036 AUG22'84

SPECIAL ANALYSIS FORM

Date Collected: 8-21-84

Date Received 8-21-84

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
DIVISION OF LAND/NOISE POLLUTION CONTROL

COUNTY:	FILE HEADING:	FILE NUMBER:
Cook		

SOURCE OF SAMPLE: (Exact Location)

Grid #14 Republic steel 0-6"

14B

PHYSICAL OBSERVATIONS, REMARKS: Soil

TESTS REQUESTED: EP Toxicity

COLLECTED BY: Jane Ehart

TRANSPORTED BY: Jane Ehart

LABORATORY

RECEIVED BY: M. Galloway

DATE COMPLETED:

DATE FORWARDED: OCT 10 1984

Selenium – 0.054

Chromium – 0.01

RESULTS EXPRESSED IN MG/LITER UNLESS OTHERWISE SPECIFIED.

J Daugherty

Initial pH 9.7

Final pH 6.3

RECEIVED
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Illinois Environmental Protection Agency

BORING NO. Grid 15 | WELL NO. – | GROUNDLEVEL ELEV | PAGE 1 OF 1

COUNTY Cook | SITE NO.

SITE South Side Chicago Study

BORING LOCATION Wolf Lake

DRILLING EQUIPMENT Tile Spade | SIZE | TYPE

COMPLETION DEPTH 6" | BEDROCK DEPTH | TOP OF CASING

DATE — START 8-21-84 FINISH 8-21-84

TIME — START 2:50P FINISH 2:57P

ANNULUS FILL MATERIAL — ABOVE PACKING | PACKING | SCREEN

WELL CASING | TYPE AND QUANTITY

SCREEN INTERVAL | TYPE AND QUANTITY

PERSONNEL
L. J. Ehrat
D. D Tolan
H. K. Bosit

SAMPLES

ELEV.	DESCRIPTION	DEPTH	Sample No.	Sampler Type	Sample Recovery Ft	Penetrometer (Strength)	N Value (Blows)	REMARKS
	0.0 - 0.5 Silt, Sand, and Gravel, dark brn to grey	0	15A					dug 6"
		1						

Note Sample 15A
- tested for Metals Acid Digest (Cadmium)
- tested for E.P Toxicity

☆ Sample collected from 0 - 6"

Time Collected: 2:50 P

Date Collected: 8-21-84

SPECIAL ANALYSIS FORM

Lab # C01037 AUG22'84

Date Received 8-21-84

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
DIVISION OF LAND/NOISE POLLUTION CONTROL

COUNTY:	FILE HEADING:	FILE NUMBER:
Cook		

SOURCE OF SAMPLE: (Exact Location)

Grid #15 Wolf Lake sampled from 0 to 6"

15 A

PHYSICAL OBSERVATIONS, REMARKS: soil

TESTS REQUESTED: Metals acid digest and EP Toxicity

* Note only one bottle

COLLECTED BY: Jane Ehat TRANSPORTED BY: Jane Ehat

LABORATORY

RECEIVED BY: T. Butamay DATE COMPLETED: DATE FORWARDED: OCT. 10 1984

Acid Digest	"E.P. Toxicity"
Cadmium <2.5 mg/Kg	Cadmium = <0.01 mg/liter
(ppm dry weight basis)	Initial pH 8.6
	Final pH 5.1
	RESULTS EXPRESSED IN MG/LITER UNLESS OTHERWISE SPECIFIED.
	RECEIVED J. Daugherty
	OCT 11 1984
	IEPA-DLPC

IL 532-0314
LPC 8A 4/77

C001037 (NOT FOR DATA PROCESSING)

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